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June 26, 2008

Ms. Donna Inman
US EPA Region 8
8ENF-UFO
Technical Enforcement Program
1595 Wynkop Street
Denver, Colorado 80202-1129

Re: Draft Work Plan
Phase 1 of Interim Remedial Action
Keller Trucking Fuel Truck Spill
Polson, Montana.

Dear Ms. Inman,

Environmental Partners, Inc. (EPI) is pleased to submit this *Draft Work Plan* for Phase 1 of Interim Remedial Actions at the Keller Transport fuel truck spill at mile marker 5.2 of Highway 35 in Polson, Montana (site). The general location of the site is indicated on Figure 1. This *Draft Work Plan* is being provided on behalf of Keller Transport (Keller) and its insurer, ACE Westchester Specialty Group (ACE). The site is subject to an Administrative Order (Order) under Section 311(e) of the Clean Water Act (CWA) and Section 7003 of the Resource Conservation and Recovery Act (RCRA). The Order was issued by EPA Region 8 on May 22, 2008 and was received by Keller Transport on May 28, 2008. EPI is the technical lead on the project and Mr. Thomas Morin is the Project Coordinator for the site.

This *Draft Work Plan* is being provided in compliance with the requirements of the Order. The Order contained a requirement to provide a *Draft Work Plan* by June 22, 2008. In a letter dated June 16, 2008, EPI requested an extension to that deadline based upon the need to continue to conduct emergency response actions, the fact that the release had not yet been fully characterized, and the necessity for additional information before providing EPA with a comprehensive Work Plan. An extension was granted until June 26, 2008, which was less than requested and was based upon EPA's concern that the project should transition from emergency response to remedial action in a more rapid fashion.

Keller and EPI share EPA's interest in transitioning the site to a more comprehensive remedial action as expressed in the June 16, 2008 request for extension. It remains EPI's opinion that additional information and data are needed to provide a fully comprehensive scope of work for bringing the site into full compliance with applicable regulations. It is also Keller and EPI's opinion that conditions at this site do not afford the luxury of completing a full Remedial Investigation/Feasibility Study (RI/FS) prior to making decisions on a Cleanup Action Plan (CAP). Therefore, Keller and EPI proposed that the project progress in an iterative fashion with successive phases of work being based upon the findings of earlier phases. EPA will be provided with draft work plans for review and comment prior to each phase of work and Keller and EPI would seek concurrence with EPA on the proposed scopes of work. In this way it will be possible to take a measured and step-wise approach to investigation and remediation without preparing work plans that overreach the available information and which may, with the collection of additional data, not be wholly appropriate for actual site condition.

This *Draft Work Plan* proposes the scope of work for Phase I of Interim Remedial Actions at the site. Phase I of the Interim Remedial Actions is focused on the following objectives:

- Conducting an interim remedial excavation for highly contaminated soil near the shoreline of Flathead Lake;
- Designing and implementing a system to capture and treat separate-phase hydrocarbons (SPH) and dissolved-phase contaminants in ground water prior to discharge to Flathead Lake;
- Designing and installing indoor air vapor mitigation systems at five residences located above the SPH and/or dissolved-phase plume; and
- Performing additional investigative actions to fill data gaps in the characterization of the nature and extent of the release.

Based upon the compressed working season at the site, some of this scope of work has been started and is ongoing. EPA and other agencies and stakeholders have been receiving routine weekly updates of site activities via electronic mail. The weekly updates provided to date are included with this plan as Attachment A.

Successive phases of site work are anticipated to include additional investigation and remediation of the dissolved-phase contaminant plume in areas hydraulically upgradient of the lakeshore and nearer the location of the spill. Appropriate locations for such treatment will be based upon more complete site characterization data.

The remainder of this Draft Work Plan contains the following sections:

- Background – This section presents a summary of prior occurrences and actions at the site.
- Conceptual Site Model – This section presents a synthesis of the currently available characterization data and EPI's understanding of the nature, extent, fate, and mobility of environmental impacts.
- Scope of Work – This section presents the planned remedial and mitigation actions. Some of these tasks are presented in conceptual terms since data continue to be gathered and the details are not yet finalized. EPA will be kept current on all such actions through routine status updates and as a recipient of all planning and design documents.

Background

The fuel spill occurred on April 2, 2008 and emergency response actions were immediately implemented. The spill site was located up-slope of five homes that are situated between Highway 35 and the Flathead Lake shoreline. The horizontal distance between the spill site and Flathead Lake is approximately 400 feet with an average slope of about 18 percent to the shoreline. The first five homes, from north to south, are known as the Arnold, Kohler, Jones, Gates/Sykes, and Rothwell homes. A site representation is shown on Figure 2.

Subsequent to the spill, strong fuel odors were noted in several of the down-slope homes and separate-phase hydrocarbons (SPH) were noted in small landscape ponds at the Arnold and Kohler properties, and in ground water seeps that discharge to the Flathead Lake shoreline. In response to these findings, the five homes mentioned above were evacuated and a seep collection and temporary water treatment system were constructed and installed. That treatment system utilized air sparging as primary treatment and granular activated carbon (GAC) as secondary treatment prior to discharge to the lake. The discharge was conducted on an emergency basis and a National Pollution Discharge Elimination System (NPDES) permit application has since been filed with the EPA. EPA has reportedly reviewed the permit application and will be requesting revisions to the application before a permit is granted. As of the date of this report, EPI has not received EPA's requested revisions to the NPDES permit application.

The temporary treatment system has since been upgraded to provide better treatment efficiency in the primary treatment cell (*i.e.*, air sparging) and to decrease the contaminant load on the secondary treatment cell (GAC). An additional seep catchment has since been added to capture a release from a seep on the northern portion of the Arnold property (*i.e.*, N143 seep). Routine sampling of the discharge from this seep indicated that concentrations had increased to a point where they exceeded 2.2 micrograms/Liter (µg/L) of benzene. Both the Confederated Tribes and Lake County Office of Emergency Management were notified and a plan for installing the catchment structure was agreed upon and implemented.

The Project Coordinator at the time of the initial response, Cedar Creek Engineering, also implemented ground water sampling and analysis consisting of installing a number of monitoring wells within the bedrock strata as well as a number of temporary wells in the unconsolidated soils overlying the bedrock. The bedrock wells were sampled and indicated the presence of SPH in at least one well and elevated concentrations in several of the other wells. The shallow temporary wells were then installed within the unconsolidated soils overlying the bedrock near the shoreline of Flathead Lake. Sampling and analysis of those wells indicated the presence of sheen and high dissolved-phase concentrations in a number of locations near the landscape ponds on the Arnold and Kohler properties. In mid-May, after a hard rainfall event, an additional free product seep appeared on an upland portion of the Jones property and additional mitigation was performed.

In late May EPI became the Project Coordinator. Upon review of the characterization data available at that time, it became clear that the extent of the release and subsequent impacts had not been sufficiently characterized to develop a comprehensive remedial strategy. In particular, there were not sufficient data regarding the location of the SPH, the migration mechanism for the SPH to the lakeshore and seeps, and the lateral distribution of dissolved-phase contaminants. EPI immediately implemented additional sampling and analysis at the site. This sampling and analysis consisted of the following:

- Assessment of the presence of SPH, thickness of unconsolidated soil, and depth to bedrock in 80 locations on the Arnold, Kohler, Jones, Sykes/Gates, and Rothwell properties. This sampling was performed using Laser-Induced Fluorescence (LIF) and a limited-access direct-push rig. Additional information on LIF technology is available at www.wcec.com.

- Contemporaneous sampling and analysis of all on-site monitoring wells.

- Contemporaneous discrete sampling of each seep and discharge location to Flathead Lake. These samples are currently being collected on a daily basis.

- Detailed sampling and analysis of the treatment system performance both at the inlet and outlet of the system and at intermediate points within the system. These data provide information on the contaminant load placed upon the various components and the efficiency of those components. Samples from the treatment system discharge are currently being collected on a daily basis.

- Fully quantitative analysis of indoor air quality at the Arnold, Kohler, Jones, Sykes/Gates, and Rothwell homes. This sampling was performed using Summa canisters with a 24-hour nozzle and included samples in the breathing zone on both the bottom floor and the next upper floor in each residence. Ambient air samples were also collected outside of the homes to assess background air quality during the same time interval that indoor air was being sampled.

- Sampling and analysis of water quality at the on-site drinking water well. These samples include water directly from the well, from the storage cistern, and from the pressure vessels. These samples are also being collected daily.

These data have been used to develop a conceptual site model, which forms the basis for the proposed interim remedial measures presented below. The data collection and analysis procedures are presented in greater detail below and will be presented in a comprehensive report at the end of the 2008 construction season when all pertinent data for the 2008 work have been collected and reviewed.

Conceptual Site Model

<u>Lithologic Conditions</u>

During investigation of the site a total of 10 monitoring wells (*i.e.*, MW-1 through MW-10) were drilled and installed into the underlying bedrock using air rotary drilling methods. An additional 18 temporary monitoring wells (i.e., TMW-1 through TMW-13, P1 through P4, and PW-1) were installed in the unconsolidated colluvial soil overburden using hollow stem auger drilling methods. In additional those initial actions and investigation of the occurrence of SPH in soil was conducted using Laser-Induced Fluoroscopy (LIF) methods with a track-mounted direct-push rig. These investigative actions have served to provide a very good characterization of the lithologic conditions at the site. During these drilling and exploration activities observations of soil and rock type were recorded as was the thickness of the overlying soil. All surface elevations and well elevations were surveyed to an absolute datum (*i.e.*, horizontal datum to the Montana Coordinate System NAD83, vertical datum to NAVD88). A detailed topographic survey of the site was performed by Morrison Maierle and is presented as Attachment B.

The site slopes from east to west at an average grade of about 18% from Highway 35 to the Flathead Lake lakeshore. The subsurface conditions generally consist of a thin veneer of topsoil atop native colluvial soils varying in thickness from 0.5 feet to 25 feet and overlying a fractured bedrock. The bedrock consists of mostly limestone interbedded with dolomite, dolomitic siltite, siltite, and argillite identified in geologic maps as the Helena formation. Where exposed immediately east of Highway 35, the bedrock has an apparent strike of about N55W and a dip of about 35 to 45 degrees. Fractures within the bedrock appear to be generally vertically oriented with a northeast-southwest and northwest-southeast Anderson-Coulomb fracture pattern indicating primarily north-south compressional forces. The local area is highly faulted and fractured.

Near and slightly upland of the lakeshore the unconsolidated sediments overlying the bedrock become lacustrine clays, silts and sands and are considerably less permeable than the upland colluvial sediments.

Figure 2 illustrates the surface elevation contours of the site and Figure 3 illustrates the elevation contours of the underlying bedrock. Comparing these two figures indicates that, with the exception of the northwest corner of the site (*i.e.*, LIF borings 22, 23, and 24), there are not major topographic differences between the soil surface and the bedrock surface of the site. In the northwest corner of the site, the bedrock dips to approximately 20 feet below grade whereas the remainder of the site, bedrock is at depths ranging from 2 feet to 8 feet below grade.

Figure 4 illustrates an interpretive cross-section along the general axis of the contaminant plume (discussed in greater detail below). Figure 4 illustrates the typical slope of the bedrock and site surface from east to west, the variability in soil overburden thickness, the change in soil type near the lakeshore, and the depth to ground water relative to the bedrock and soil.

<u>Piezometric Conditions</u>

As noted above a total of 28 permanent and temporary monitoring wells have been installed at the site. The surface elevation and casing elevation for each of these wells has been surveyed which allows for development of contours of the piezometric surface of the shallow ground water. Table 1 presents a summary of water level and survey elevation data. Figure 5 presents piezometric contours for June 9, 2008.

Ground water at the site is present under water table conditions with a hydraulic gradient of about 0.08 feet/foot in a generally west-northwesterly direction. In general, the apparent ground water flow direction mimics the local topography. Ground water is generally present within the bedrock at a depth of about 38 feet below grade near Highway 35 (*i.e.*, MW-2) and becomes very shallow near the lakeshore where the lake level and the ground water level intersect. In several locations the water table is artesian and shallow wells have piezometric water levels that are above the ground surface. This is generally manifested in the various seeps located within about 10 to 20 feet of the lakeshore.

These artesian conditions are variable and appear to originate when the ground water within the bedrock encounters the relatively permeable colluvial soils and migrates toward the lakeshore. When this ground water encounters the less permeable lacustrine clays, those clays can act as a dam forcing a localized rise in the piezometric surface resulting in seeps.

Ground water migration within the bedrock is primarily along the secondary porosity resulting from the intersection of bedding plans and fractures. Secondary porosity flow can be relatively rapid with localized high rates of ground water flux within particularly permeable fracture materials. The effects of this secondary porosity flow on the fuel spill are discussed in greater detail below.

<u>Distribution of SPH and Dissolved-Phase Impacts</u>

In late May EPI implemented the LIF investigation with a round of contemporaneous ground water sampling and analysis for all monitoring wells. The LIF investigation utilizes a down-hole laser to induce fluorescence of non-polar petroleum hydrocarbons and then measures both the occurrence and level of fluorescence. These data are provided in real-time and allow for an iterative approach to investigation of the presence of SPH, where successive LIF sampling points are guided the results of prior locations. This approach provides a characterization of the occurrence and thickness of soils saturated, or nearly-saturated, with SPH. The occurrence of such soils likely indicates that location where SPH on ground water has intersected the overlying soils and indicates those soils that represent a source of hydrocarbon dissolution to shallow ground water and, potentially, surface water.

Figure 6 illustrates the distribution and thickness of SPH in shallow soils as indicated by the LIF survey. Table 2 summarizes the data collected during the LIF investigation. This SPH distribution correlates well with the area of greatest SPH seepage and the distribution of dissolved-phase compounds.

Some SPH appears to be located on the water table in locations upgradient of the lakeshore. SPH has been measured in well MW-4 at a maximum thickness of 0.04 feet on June 16, 2008 and several wells (*i.e.*, MW-1, MW-8, and TW-11) contain gasoline-range petroleum hydrocarbon (GRPH) concentrations that approach or exceed the expected aqueous solubility of gasoline fuel. This indicates that SPH may be present in these areas or as localized areas of SPH within bedrock fractures is resulting in high dissolved-phase concentrations. The potential distribution of SPH on ground water upgradient of the lakeshore is a data gap in the current level of investigation.

Figures 7 and 8 illustrate the interpreted distribution of dissolved-phase GRPH and benzene in ground water. Table 3 summarizes the analytical results for the contemporaneous ground water samples collected at the site between June 7 and June 9, 2008, which form the basis for the interpretation in Figures 7 and 8.

The distribution of dissolved GRPH and benzene appears to be northwesterly nearest the spill and then more westerly nearer the lake, resulting in a westward curving plume. The distribution of these compounds indicates that the dissolved-phase plume is relatively large and of a high source strength, as indicated by concentrations in water nearing saturation. This distribution is consistent with the local geologic and hydrogeologic conditions, with the interpreted location of SPH in soil, and observed seep conditions.

It is EPI's opinion that the current level of characterization of these compounds is sufficient to develop an effective interim remedial measure that is protective of surface and ground water quality. The distribution of impacts is fairly well characterized although some data gaps in the distribution do exist. Resolving those data gaps to a level consistent with the general requirements of a remedial investigation is discussed below in later sections of this document.

Indoor Air Impacts

As noted above, the spill has resulted in impacts to indoor air quality at five homes at the site. These homes are the Arnold, Kohler, Jones, Sykes/Gates, and Rothwell homes. Shortly after the accident odors were detected in the homes and subsequent qualitative and semi-quantitative air monitoring were sufficient to determine that air quality within the homes had been affected to the point that the residents should be temporarily evacuated. Each of these five homes remains vacant.

On June 11, 2008 EPI implemented a program of fully quantitative indoor air sampling at each home. This sampling consisted of placing a Summa canister with a 24-hour nozzle on both the bottom floor and next upper floor of each home and placing two upwind background samples south of the southern most home. The homes were fully sealed for the full 24-hour period.

Each of the 12 Summa canisters was submitted for analysis by EPA Method TO-15 on a rush turnaround basis. These analytical results are summarized in Tables 4 through 8. It is understood that indoor air quality mitigation will be necessary and these data were intended to serve as a quantitative baseline of current conditions.

A variety of compounds were detected within each of the five homes. These included compounds most commonly associated with gasoline fuels such as benzene, toluene, ethylbenzene, xylenes, ethanol, and other aromatic and aliphatic hydrocarbons as well as a variety of compounds not associated with fuels. These non-fuel related compounds included compounds such as tetrahydrofuran, styrene, 1,1,1-trichloroethane and other chlorinated and brominated compounds as well as some compounds within the background air samples (*i.e.*, chloromethane).

These non-fuel related compounds are commonly associated with consumer products and do not relate to the fuel spill. In houses that have been sealed for a period of time these non-fuel related compounds can be off-gassed from carpets and padding, mattresses, plastics, and even small quantities of household cleaners. For example, the presence of freon in samples may indicate a refrigeration leak and acetone in samples may be associated with stain removers.

Of the affected homes, the highest concentrations were observed in the Arnold and Kohler residences, with lesser concentrations in the Jones and Sykes homes. The Rothwell home was the least impacted but still contained concentrations of fuel related compounds that indicates some level of vapor migration into that home.

Table 9 contains a comparison of potentially applicable indoor air cleanup levels for those fuel-related compounds that were both detected in the air sample noted above and for which cleanup levels exist. These cleanup levels are based upon a residential exposure model, which, among other things, assumes a 24-hour/day and 365 day/year exposure and includes juvenile exposures. Where applicable the carcinogenic (*i.e.*, lower) cleanup level has been presented (*e.g.*, benzene) and the non-carcinogenic risk cleanup level has been presented for all other compounds.

Cleanup levels for known or suspected carcinogens is based on an excess cancer risk of 1 in 1,000,000. That is to say, exposure to those concentrations, over a 30-year period, 24-hours/day, 365 days/year by a 70 kilogram individual at a normal breathing rate may result in cancer in 1 in 1,000,000 persons. This is compared to the nominal cancer rate for any given US citizen of 1 in 4. Cleanup levels for non-carcinogenic compounds are based upon a health risk or calculated Hazard Quotient of 1.0.

It is EPI's understanding that on sites where the Montana Department of Environmental Quality (MDEQ) is the lead regulatory agency the cleanup levels presented by the EPA Office of Solid Waste and Emergency Response (OSWER) are the default cleanup levels. However, the EPA Region 9 Preliminary Remediation Goals (PRGs) are also sometimes used. These values differ only slightly and the OSWER values are generally the more restrictive. Neither the National Institutes of Occupation Safety and Health (NIOSH) nor the Occupational Safety and Health Administration (OSHA) values are considered applicable at this site since those have been developed for an occupational/worker exposure and not a residential exposure.

Comparing the available data to the available air cleanup levels confirms prior knowledge that vapor mitigation is required at each of these five homes. Unless advised differently by EPA, EPI will evaluate the effectiveness of vapor mitigation efforts against the OSWER values.

Contaminant Migration Pathway and Mechanisms

Based upon the available data it is possible to develop a conceptual model of contaminant migration that is fully consistent with the observed conditions. As additional data are collected it may be appropriate to modify and refine this conceptual model.

On April 2, 2008 a single vehicle accident on Highway 35 resulted in the rapid release of about 6,300 gallons of gasoline fuel to a drainage ditch on the west side of the highway. The released fuel migrated laterally as surface flow in the ditch and infiltrated vertically into the soil and underlying bedrock. Vertical migration was fairly rapid and no liquid fuels were recovered at the spill site.

After infiltrating through the soils the fuel entered the secondary porosity of the underlying bedrock. The data suggest that initially the fuel migrated on a vector along strike and dip of the bedrock as well as vertically onto the underlying ground water. This resulted in the northwesterly contaminant migration observed in the portion of the dissolved-phase plume nearest the highway. It is possible that there may have been a contributory effect on dissolved-phase flow from the general cone of depression formed by the water supply well. However, this well pumps only intermittently and does not have a strong and consistent effect on the local piezometric conditions. Further characterization will include an assessment of pumping at the drinking well on local peizometric conditions.

Any SPH that migrated vertically through the bedrock encountered ground water and likely formed a layer of SPH on the water table. This layer of SPH would then have migrated downgradient toward the lakeshore.

At a location upland of the lakeshore the water table intersects the soil overburden. Soils have a primary porosity and permeability that provides some amount of storage and saturation of SPH that does not generally exist within the bedrock. These SPH-saturated soils are those that are identified on Figure 6 and which were detected during the LIF investigation.

As SPH migrated more slowly downgradient through the soil matrix it encountered the less permeable lacustrine clays near the lakeshore. These clays served as a barrier to additional horizontal flow and resulted in the SPH migrating toward natural ground water seeps. These seeps present as landscape features on the Arnold and Kohler properties and as seeps to the lake. Immediately after a large rain event and an associated short-term rise in water level these seeps and SPH can also become artesian as was observed on the Jones property within the core of the SPH-saturated soils.

It has only been about 12 weeks since the initial spill. This is a relatively short period of time after a release and it is not expected that the dissolved-phase of the contaminant plume as reached a steady-state lateral distribution. This is suggested by the recently increased dissolved-phase concentrations in the seep on the Arnold property (*i.e.*, N143) and upon a basic understanding of hydrogeology and contaminant transport. It is suspected that as the dissolved-phases migrate downgradient toward the lakeshore the “dam” effect of the lacustrine clays may result in a broadening to the north and/or south of the dissolved-phase impacts.

Vapor migration into the five residences is primarily vertical through the bedrock fractures and unconsolidated soil overburden. Vapor concentrations within air in the unsaturated factures of the bedrock likely contains high vapor concentrations of fuel hydrocarbons. As water levels rise and fall it results in a “pumping” action on the air above the water table. When water levels rise after a storm event or during a thaw soil gases are forced upward and can enter the homes. Similarly, atmospheric pumping can occur in response to changes in barometric pressure. The barometric pressure within the soil and rock represents an average barometric pressure. When a low pressure system moves over the site the higher pressure in the soils/bedrock relative to the air can result in upward migration of vapors. If there are cracks in floors or uncovered crawl spaces fuel vapors can readily migrate into home. This is also the case if the inside of the home has a lower pressure, due to heating ventilation and air conditioning (HVAC), relative to the soil/bedrock pressures.

Scope of Work

The scope of work presented below for Phase 1 of the Interim Remedial Action at the site is focused on meeting the following objectives:

- Continue operation, maintenance, and compliance sampling of the existing seep water collection system until a more permanent system can be installed.

- Continue sampling and analysis of the on-site water supply system to assess and confirm continued compliance of drinking water with applicable standards.

- Implement an interim remedial action to remove accessible SPH impacts and protect, on a more sustainable basis, water quality in Flathead Lake.

- Implement indoor air vapor mitigation at the five affected homes.

- Assess temporal changes in the distribution of SPH and dissolved-phase constituents until additional ground water remediation can be performed.

- Continue to perform remedial investigation actions necessary to fill existing data gaps and characterize the extent of SPH and dissolved-phase impacts.

Due to time and weather constraints it is imperative that a more permanent treatment system be designed and installed before mid-October 2008. The current temporary system was not designed to, and cannot be made to, withstand a local winter. As such, the scope of work in Phase 1 is focused on environmental protection of Flathead Lake and mitigation of human exposures inside the affected homes. Additional investigative actions will be initiated when time and site conditions allow, but no later than Spring of 2009.

The objectives presented above will be met using the following scope of work.

<u>Operation, Maintenance, and Compliance Sampling</u>

Operation, maintenance, and compliance sampling of the current temporary treatment system has been ongoing since the system was installed. EPI has continued this sampling. In addition, assessment of system performance has indicated that several upgrades were necessary to the system. These upgrades have been, or are currently being performed.

As an example of an implemented upgrade, the system functions with both air sparging as primary treatment and GAC adsorption as secondary treatment prior to discharge. An assessment of the treatment system indicated that, as configured in early June, very little treatment was occurring in the primary air sparging cell. This resulted in excessive dissolved-phase concentrations being sent to the secondary treatment and placing an overly large treatment burden on the GAC.

In response to this finding the primary treatment chamber has been upgraded to increase residence time, increase air sparging airflow, and to improve the distribution of air/bubbles throughout the treatment chamber. This was done by adding a larger treatment chamber, placing weirs inside the chamber, placing a number of horizontal air diffusers inside the chamber, and doubling the airflow. These actions were necessary to maintain compliance with surface water discharge criteria at the system effluent. The primary regulatory standard for discharge contained within the Order is 2.2 μg/L of benzene. The system discharge is sampled daily and has been submitted for analysis of volatile petroleum hydrocarbons using MA-VPH analytical methods. EPA continues its review of the NPDES permit application submitted by Cedar Creek Engineering and we assume that the review, and file permit application, will have specific compliance monitoring requirements.

EPI proposes that for permit compliance purposes that EPA Method 8021B be used for benzene, toluene, ethylbenzene, and total xylenes analysis at the system effluent. This will allow the same level of environmental protection monitoring and will be much less costly to the project. EPI also proposes that sampling and analysis of the system effluent be performed three times per week, typically on Monday, Wednesday, and Friday and that analyses be performed on a "rush" 24-hour basis. Once compliance has been consistently established for 4 weeks, sampling and analysis can be reduced to a once per week basis with those analyses also being performed on a 24-hour turnaround basis.

EPI also proposes that environmental compliance sampling be conducted on a weekly basis to assess exposure to the lake that may not originate from the system discharge but which may originate from unknown/undiscovered seeps. EPI proposes once weekly collection of five surface water grab samples from locations 15 feet outboard of the high water line at the time of sampling. These sampling locations are indicated on Figure 9.

Surface water samples would be submitted for analysis by EPA Method 8021B under 3 day turnaround. Samples would not be collected at a time when there is active boat fueling at an upwind dock or operation of gasoline powered watercraft near or upwind of the sampling locations. Sampling would be delayed until a sufficient amount of time, at least 60 minutes, after such activities had been ceased.

Ongoing Sampling and Analysis

Table 10 summarizes the current level of ongoing and routine sampling and analysis at the site. This program of sampling and analysis was implemented in order to gather contemporaneous ground water and seep data in support of developing an interim remedial action and preparation of this Draft Work Plan. It is our current opinion that this level of sampling and analysis is excessive and does not provide benefit commensurate with the significant cost. In an effort to control project costs and still provide needed and useful data, EPI proposes that the current sampling schedule be modified to that summarized in Table 11.

In general, this revised sampling schedule includes the following:

- **Permanent and Temporary Monitoring wells**; Monthly sampling with 5-day turnaround. Analysis using EPA Method 8021B for BTEX and NWTPH-Gx for total petroleum hydrocarbons. It is acknowledged that the site is significantly impacted and ongoing sampling is for the purposes of characterization not demonstrating compliance. As such, these less expensive yet still highly precise and accurate methods with low detection limits will provide the data necessary.

- **Seeps;** Weekly sampling with 24-hour turnaround. We propose analysis by EPA Method 8021B for BTEX. Benzene is the primary regulatory driver for discharge to surface water and this analysis provides a high level of sensitivity using an EPA-approved SW-846 method.

- **Treatment System Effluent;** Sampling conducted three times a week on Monday, Wednesday, and Friday for BTEX using EPA Method 8021B. Analyses will be performed on a “rush” 24-hour basis. Once compliance has been consistently established for 4 weeks, sampling and analysis can be reduced to a once per week basis with those analyses also being performed on a 24-hour turnaround basis.

- **Surface Water;** Weekly collection of five surface water grab samples from locations 15 feet outboard of the high water line at the time of sampling. Surface water samples would be submitted for analysis by EPA Method 8021B under 3 day turnaround. Samples would not be collected at a time when there is active boat fueling at an upwind dock or operation of gasoline powered watercraft near or upwind of the sampling locations. Sampling would be delayed until a sufficient amount of time, at least 60 minutes, after such activities had been ceased.

- **Water Supply Well**; The water supply well and system has been sampled on a daily basis since June 2, 2008. Water samples are collected at the inlet to the system (*i.e.*, point closest to the well discharge, from the storage cistern, and at the discharge point to the homes). These data are summarized in Tables 12 through 14. At no point have fuel hydrocarbons been detected in any of these samples at a concentration exceeding a method detection limit. These data provide a body of evidence that indicates that the drinking water well has not yet been impacted and, as time goes by, is unlikely to be come impacted. The well is located cross-gradient of the spill site and does not exert a significant cone of influence. EPI proposes twice weekly sampling (*e.g.*, Monday and Thursday) of the well discharge to the system and of the system discharge to the homes. All analyses would be run on a 48-hour rush turnaround basis and analysis would be performed using the MA-TPH-Volatile Range analysis. The homeowners association has requested that EPI cease sampling the open cistern. Therefore, sampling since June 16, 2008 has been, and will be, limited to the supply well and the system discharge.

It is EPI's opinion that this sampling protocol will provide the level of environmental protection and monitoring appropriate for the site while controlling excessive laboratory costs that provide little, if any, additional benefit to the site or the actions to be taken at the site.

Interim Remedial Actions

It must be acknowledged that in order to implement any active remedial action at the site it will be necessary to obtain permission from the landowners to perform this work. Much of the proposed work will be highly disruptive to the affected properties and it will be necessary for Keller Transport and EPI to obtain access agreements for the specific proposed actions. Regardless of Keller Transport's intentions, in the absence of agreement from the landowners it may not be possible to comply with the requirements of the Order. Keller Transport and EPI are tentatively set to meet with the landowners on July 26 to discuss the proposed remedial actions and how those actions will affect their properties. After that meeting it will be possible and appropriate to finalize the details of the remedial actions.

The interim remedial action will consist of three primary components. These include a mass excavation of the area of identified SPH, design and installation of two ground water interceptor trenchs, and design and installation and operation of a treatment system for the collected liquids.

- **Mass Excavation.** As noted above there is an area of the site where SPH migrating on the water table as intersected porous soils and has become sorbed to the soil matrix. These soils are essentially saturated with SPH and will act as a longer-term source of hydrocarbon dissolution to ground water, and as a source of vapor to air, if not removed or remediated.

  These impacted soils are relatively shallow and readily accessible. EPI proposes mass excavation to immediately and permanently remediate these impacts. Mass excavation is highly effective, readily implemented, and its effectiveness can be clearly demonstrated through the use of sampling and analysis at the limits of the remedial excavation.

  Mass excavation would be conducted using standard track- or tire-mounted excavators. The area of impacts is readily accessible to such equipment and excavated material can be directly loaded into single trucks or truck and transfer boxes for off-site treatment/disposal.

  The estimated area of mass excavation is indicated on Figure 9. This area consists of the extent of SPH-saturated soils and those soils extending to the interceptor trench, which is discussed in additional detail below. Based upon our current understanding of local soil and bedrock occurrence the excavation would be as deep as 8 to 10 feet below grade to the north and west and about 3 to 4 feet below grade to the south and east. Excavation of this area would significantly impact the Arnold, Kohler, and Jones yards and would result in the demolition and removal of most of their backyard landscaping. This landscaping would be replaced with like kind to the satisfaction of the homeowners or the homeowners would be provided with a landscaping allowance.

The remedial excavation would be guided by field screening using a photoionization detector (PID), and olfactory and visual indications of the presence of contamination. The final limits of the remedial excavation would be guided by the results of laboratory analysis. The goal of the remedial excavation would be to attain the MDEQ Soil Cleanup Levels for a residential use.

Performance sampling from the final limits of the remedial excavation would be collected at a frequency of one for every 20 linear feet of sidewall shallower than 10 feet deep (*i.e.*, one sample per 200 square feet, maximum) and one sample for every 200 square feet of excavation bottom, assuming the excavation bottom is above the water table at the time of excavation. If the limits of excavation cannot be expanded any farther due to practicability issues (*e.g.*, building and foundation, slopes, excessive sloughing, bedrock), soil conditions at the final limits of the mass excavation will be documented using the sampling frequency indicated above.

During initial sample collection soil samples will be analyzed for BTEX using EPA Method 8021B since benzene is likely to be the regulatory driver for remedial excavation. Once benzene has been shown to comply with the applicable cleanup level, compliance with MDEQ cleanup levels will be confirmed by analysis using the MADEP-VPH method.

Upon attainment of cleanup levels or achieving the limits of practicability, the excavation will be backfilled. Prior to backfilling a segment of interceptor trench will be installed at the upgradient edge of the excavation. The purpose of this segment of the interceptor trench will be to capture additional contaminated water or SPH that may be entering this area and to limit, to the extent practicable, recontamination of the clean backfill. The backfill material will consist of a relatively porous self-compacting material such as pea gravel to within 1 foot of the surface. A woven geotextile will then be placed and an additional 1 foot of topsoil will be placed to allow landscaping.

- **Interceptor Trench Installation.** Installation of a ground water interceptor trench is proposed along the alignment indicated on Figure 9. This interceptor trench will be installed near the contact between the colluvial sediments and the lacustrine clays. The purpose of the interceptor trench is to capture impacted ground water and SPH as it migrates out of the bedrock and into the colluvial sediments and prior to entering the lake.

  The interceptor trench would be constructed in 6 discrete segments. Each segment would drain a separate portion of the trench. Each portion of the trench would be separated by a bentonite clay dam to eliminate, to the extent practicable, hydraulic communication along the trench. A detail of the typical trench construction is presented in Figure 10.

Trench segmentation is necessary to assess which portions of the trench are collecting the most contaminated water and, as the impacts are eventually remediated, to allow different portion of the interceptor to be shut off. If, for example, sampling and analysis indicate that Segment 6 does not contain water that exceeds a regulatory criterion, that segment can be shut off using assigned valves and the load on the treatment system can be reduced and costs can be controlled. This also allows the operation of the trench to be focused on those areas with the highest contaminant concentrations and most protective and effective capture.

The trench would be piped to a below grade lift station contained within a vault within the road on the Arnold property. This lift station would contain the appropriate valving and pumps to control flow and lift the captured water to the treatment system located at the top of the access road. It is currently anticipated that the lift station will need to be capable of handling up to 500 gallons/minute of water from the interceptor trench, or about 50 to 80 gallons/minute from each of the 6 segments.

The interceptor trench will include a provision for compliance sampling to confirm the effectiveness of the trench at capturing impacted ground water. EPI proposes a total of seven such monitoring points which would consist of either newly installed wells or converting some of the existing temporary monitoring wells to more permanent installations. Monitoring at these locations would assess the post-remedial impacts between the trench and the lakeshore as an indicator of the trench effectiveness. Interceptor trench compliance sampling wells are indicated on Figure 9. These wells will be sampled on a monthly basis using EPA Method 8021B to quantify benzene, toluene, ethylbenzene, and total xylenes concentrations.

- **Treatment System.** The tentatively planned location for the treatment system is just north of the current pump house and cistern. This area is on community property owned by the East Bay Homeowners Association and does not contain other structures. It is readily accessible for equipment and vehicles and has access to power. This location is the least disruptive to sensitive environments and has a minimal effect on the homeowners. Construction of the building will be aesthetically consistent with the pumphouse and will include visual barriers such as landscape trees and muted colors. The exact location and aesthetics of the treatment system is also a topic that will be discussed during the meeting with the homeowners on July 26, 2008.

  Due to the amount of equipment necessary and the anticipated flow it is likely that the treatment compound will need to be relatively large. It is currently anticipated that the building will be about 1,500 square feet in size and will require a 16 foot high clear span ceiling. It is anticipated that the building will be constructed of poured concrete walls and will be recessed into the hillside. The ceiling will likely be wooden trusses with a raised seam metal roof at a minimum 6/12 pitch. Construction of the building will require a local building permit and must comply with local building codes.

The ground water captured by the interceptor trench will be routed to the lift station under pressure. From the lift station the water will be pumped to the treatment system in a 6 to 8-inch PVC pipe. This pipe will daylight inside the building to prevent the potential for freezing in the winter.

The treatment system will consist of primary treatment using an oil/water separator followed by air sparging and secondary treatment using GAC, ultraviolet oxidation or ozonation. The method of treatment will be determined by the total concentrations captured by the interceptor. GAC is the preferred method due to simplicity and cost of operation. However, if concentrations are excessively high and large GAC units are necessary to achieve the necessary treatment it may be necessary to use a different secondary treatment technology. A detail of a conceptual treatment system is provided on Figure 11.

Treated water will be discharged to Flathead Lake under an NPDES permit. Treated water will be gravity drained, if possible, or pumped to a submerged outfall at the lake. At up to 500 gallons/minute a surface outfall would likely be too disruptive to the shoreline. However, it may be possible to create an artificial stream that is capable of enhancing the local wetland habitat and aesthetics of the shoreline. The nature of the outfall will need to be negotiated with the Tribes and with the Arnolds, on whose property the outfall will be located.

As discussed above, many of the specific details of the treatment system cannot be fully designed at this time due to unavoidable uncertainties. However, the approach and concept presented above are wholly applicable to the site and can be implemented and effective at attaining the desired objectives. Reducing the uncertainties to a point where it is possible to provide a detailed, specific design would require pilot testing or construction and testing of portions of the remediation system. Given the compressed schedule and time constraints such a measured approach is not possible.

EPI proposes that, if approved, the project would proceed with mass excavation and interceptor trench installation and concurrent design of the lift station and treatment system. Once installed, the influent rates and concentrations from the interceptor trench would be tested and evaluated and a design for the lift station, treatment compound, and treatment system would finalized. At each step in this process, EPA would be provided with the available information in both formal deliverables and within the monthly status reports required by the Order. In the absence of such an accelerated approach it does not appear possible to complete the design, installation, testing, and start-up of the necessary system components by the seasonal mid-October deadline. At that time there will be nighttime freezing temperatures and the existing treatment system will fail due to the nature of its construction and exposed location.

Indoor Air Vapor Mitigation

Indoor air vapor mitigation is proposed for the Arnold, Kohler, Jones, Sykes, and Rothwell homes. The mitigation system will have two components. The primary component will be an underslab or below floor vacuum extraction system and the second component will be a house pressurization system. Both components are designed to work in concert to maintain a positive pressure within the home relative to the subsurface.

The underslab vacuum extraction system will consist of a network of horizontal pipes placed below grade beneath the footprint of the home. At the Arnold home this system will be placed in the crawlspace beneath the downstairs. The piping would be placed in bedding and cover of pea gravel and the pea gravel would be covered with a heavy plastic sheeting with sealed seams and would be sealed to the walls. All of the utility and mechanical penetrations would also be sealed.

At the remaining houses the underslab system will require cutting through the floor slab, trenching about a foot into the underlying material, placing 4 inches of bedding material, laying the perforated piping, covering that piping with bedding and the replacing the concrete to match the original floor. The entire floor would then be sealed to and expansion or cold joints at the walls would be sealed with a flexible grout. The basement would then be restored.

In all cases the piping will be routed to an in-line vacuum blower that will create a mild vacuum beneath the floors. The horizontal piping will also exert a larger area of influence that a single, or even multiple, vertical pipes and is more likely to affect the entire area beneath the footprint of the house. The vacuum blower piping will be routed to the roof along the exterior of the house and vented. The vent stack will follow the same local regulations for height and distance from the roof peak as chimneys and HVAC exhaust stacks. The exterior piping will be framed and boxed in to match the existing house architecture with an access panel to service the blower and to collect vent stack air samples.

In addition to the underslab venting system each of the homes will be equipped with a heat recovery ventilator (HRV). The HRV is a air-to-air heat exchanger that draws in outside air and warms that air to the temperature of the indoor air. The outside air being brought in displaces the interior air which is vented outside. The net effect of an HRV is to place a mild positive pressure inside the home relative to the outside and also relative to the conditions beneath the slab. This increases the pressure differential above the slab relative to below the slab and further limits the potential for vapors to migrate into the home. This system will be particularly important in the winter when the homes are generally sealed to the outside. A detail of a typical vapor mitigation system is included on Figure 12.

Each of the homes contains a provision for burning wood. Fine smoke particles in carpets, draperies, and other porous materials can act as sorptive media for organic compounds, which can the desorb those same compounds under certain conditions. Given the low air cleanup level for benzene and other compounds it will be necessary to address these sorbed organic compounds in order to bring the homes into compliance with the applicable air regulations.

Depending upon cost and homeowner preference each of the homeowners may either opt to have the carpets on the bottom floor or the home, and the draperies on the bottom floor and the next floor up cleaned or can be provided with an agreed upon allowance to replace these items. Carpet padding will require replacement regardless and it is likely that carpet replacement with like kind is less expensive and more quickly accomplished that having carpet cleaned. If area rugs are present those can also be either cleaned or replaced. It will also be necessary to clean the downstairs furniture that is upholstered with porous fabrics. Such issues will be addressed individually with each homeowner.

Upon completion of installation and testing of the underslab venting system and the HRV and necessary cleaning of the homes the indoor air quality will again be tested. The testing will consist of placing 24-hour Summa canisters within a sealed home. As with the baseline sampling there will be a Summa canister on the bottom floor and the next floor above. There will also be four background samples. These samples will be located to on the vacant lot south of the Rothwell home, near the site entrance east of the Sykes home, just north of the supply well pumphouse in the location of the proposed treatment compound and west of the properties on the Jones dock.

Each of the Summa canisters will be submitted for rush analysis by EPA Method TO-15. Those data will be compared against the OSWER indoor air cleanup levels summarized in Table 9.

These houses will then remain closed and sealed for an additional 7 days and the same testing protocol discussed above will be repeated. If analytical data for each round of sampling indicate that indoor air quality is in compliance with the OSWER cleanup levels for fuel-related compounds then the homes will be deemed suitable for re-habitation. If indoor air quality is not in compliance with the applicable regulations additional appropriate actions will be evaluated.

<u>Water Supply Protection</u>

As noted, the water supply well and system will be sampled on a twice weekly basis with laboratory analysis 48-hour turnaround. If analytical results for the water supply system indicate the presence of a fuel compound at a detectable concentration the system will be immediately re-sampled and submitted for analysis under 24-hour rush turnaround. If this follow-up result confirms the earlier result then the system will be sampled on a daily basis under 24-hour rush turnaround until either a) laboratory analytical results no longer detect petroleum hydrocarbons for 3 consecutive days or b) analytical results become elevated to within 50 percent of the regulatory drinking water standard for that compound.

If analysis does not detect fuel compounds for 3 consecutive days the system will revert back to twice weekly sampling. If petroleum hydrocarbons are detected at concentrations of 50 percent or greater of the regulatory drinking water standard the residents served by the system will be provided with bottled water for consumption and will be directed to limit their use of water for bathing and showering.

If detected petroleum hydrocarbons in the supply well trigger the need to supply water to the residents EPI will notify the EPA and other agencies immediately and will evaluate additional appropriate actions.

Additional Site Characterization

While the site is sufficiently characterized to allow selection of an interim action, it has not been sufficiently characterized to consider the remedial investigation completed or to develop a remedial alternative for addressing the dissolved-phase impacts present on the upland portion of the site. The following data gaps exist:

- Characterization of the northern most portions of the dissolved-phase plume north of the Arnold property.
- Characterization of the northern, southern, and eastern portion of the plume east of Highway 35.
- Characterization of ground water impacts in the bedrock materials just northwest of the Rothwell home.
- Additional assessment of the presence of SPH on the ground water along the apparent axis of migration of the dissolved-phase plume.
- Hydraulic and pneumatic properties of the bedrock water table aquifer. These would include hydraulic permeability, isotropic/anisotropic flow, storage, and vacuum radius of influence. It will be necessary to understand these properties and others in order to evaluate and design a remedial method for treating the dissolved-phase contaminant plume.

It is not reasonably possible to fill all of these data gaps within the remainder of this field season and still meet the objectives of installing the more permanent treatment system and vapor mitigation systems. It is also acknowledged that these investigative actions are best performed in an iterative fashion with successive phases building on the prior phases of investigation.

In the remainder of 2008 this *Draft Work Plan* proposes to implement the following:

- Installation of two monitoring wells (*i.e.*, MW-11 and MW-12) north of the Arnold property.
- Installation of a monitoring well (*i.e.*, MW-13) just northwest of the Rothwell home.
- Installation of a monitoring well north (*i.e.*, MW-14) and south (*i.e.*, MW-15) of MW-1 to assess the potential northern and southern extent of the dissolved-phase plume east of Highway 35.

The locations of each of these wells is indicated on Figure 9. Each of these monitoring wells will be completed within the bedrock water table. Wells will be drilled using air rotary drilling methods. Each well will be completed with 2-inch diameter PVC casing and 0.010-inch factory machine slotted well screen. The wells will be completed at a depth of about 15 feet below the water table at the time of drilling. The wells screens will extend from about 5 feet above to about 15 feet below the water table at the time of drilling to allow the wells screen to intersect the unsaturated/saturated interface throughout normal temporal changes in water level. Each will have a sand filter pack that extends about 3 feet above the screened interval and a bentonite grout seal to within 3 feet of the surface. The surface seal will consist of concrete and a flush-mounted traffic rated well box. In the event that a flush mounted monument is not appropriate an above grade completion with a locking lid will be installed. All well drilling and construction will be performed under the supervision of a Montana-licensed well driller and a professional geologist or engineer. All well installation shall be in accordance with applicable regulations for installation of resource protection wells.

Based upon the data resulting from the installation and sampling and analysis of these new wells it may be necessary to perform additional investigation and testing. It is currently anticipated that, at a minimum, the following actions may be performed starting in the spring of 2009:

- Installation of pneumatic and hydraulic monitoring wells near MW-4 and pilot testing of remedial technologies using MW-4 (if applicable) as an extraction well. Pilot testing will likely include dual-phase extraction, ground water pumping, air sparging, and soil vapor extraction. Based upon the site conditions each of these technologies may be applicable and each has its potential advantages and disadvantages depending upon actual conditions. Pilot testing would be performed to determine which remedial technology is the most practicable and most likely to be effective.

- Installation of additional monitoring wells. It is currently anticipated based upon the available data that one to two wells will be needed east of well MW-1 to characterize the eastward extent of the dissolved-phase plume for upgradient control. The current conceptual model indicates that fuel flow immediately after the spill was governed by the structure of the bedrock and fractures within the bedrock. This condition suggests the possibility that there was an eastward component of flow. The GRPH and benzene concentrations consistently observed at MW-1 indicate that SPH did encounter ground water in this area and additional data are necessary to characterize with other areas are impacted.

- Design and implementation of a remedial system to address dissolved-phase impacts at the site.

Based upon the data collected it may become necessary to perform other actions. Such potential actions will be evaluated as this project progresses.

Schedule

By necessity, much of the work at the site is ongoing. The treatment system is being operated and maintained and routine monitoring is ongoing. The following presents key schedule start dates for the work propose herein:

- Submittal of Draft Work Plan; June 26
- Receipt of EPA Comments; July 10
- Final Work Plan (subject to homeowner access for specific actions); July 24
- Homeowners Meeting; July 26
- Completed Interceptor Trench Design and Mass Excavation Plan; August 1
- Complete Lift Station Design; August 1
- Additional Monitoring Well Installation; August 4
- Initial Mass Excavation and Interceptor Trench construction; August 11
- Begin Lift Station Construction; August 11
- Complete Treatment Compound and Treatment System Design; August 15
- Order and acquire Treatment Equipment; Beginning August 18
- Complete NPDES Permitting for Treatment System; August 29
- Complete Mass Excavation and Interceptor Trench; August 29
- Complete Lift Station Construction; August 29
- Complete Permitting for Treatment Compound: August 29
- Initial Treatment Compound Construction; September 3
- Complete Treatment Compound Construction; September 26
- Installation of Treatment System; September 29
- Startup and Testing of Treatment System; October 6
- Shutdown of Temporary Treatment System; October 13
- Demolition of Catchment Structures and Removal of Temporary System; October 17

This schedule also includes, by reference, the schedule for monthly status reports due to EPA. Those status reports are due on, or about, the 11th of each month.

As expressed earlier, there is an aggressive and compressed schedule for this project and meeting the above schedule depends upon many things going well. These include approval of access from the homeowners as well as timely approval from the various agencies that have regulatory authority. Keller and EPI will make all best efforts to meet the schedule presented above. Keller and EPI will sincerely appreciate EPA's assistance in meeting this schedule and any flexibility and latitude EPA may be able to provide.

Closing

If after reviewing this *Draft Work Plan* you have any questions or need additional information, please feel free to call me at (425) 395-0030. We look forward to your response.

Sincerely,

Thomas C. Morin

Thomas C. Morin, L.G.
President and Principal Geologist

Mr. Eric Koltes, L.G.
Senior Geologist

cc: Mr. Mark Yavinsky; ACE Westchester Specialty Group
Mr. Charles Hansberry; Counsel for Keller Transport
Mr. Thomas Jones; Counsel for ACE Westchester
Mr. Ron Kohler; President, East Bay Homeowners Association
Mr. Mike Durglo; Confederate Tribes
Mr. Steve Stanley; Lake County, Office of Emergency Management

Tables

Figures

Attachments

Tables

Table 1
Summary of Ground Water Elevation Data
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Sample Location	Date	Easting[(a)]	Northing[(a)]	Casing Elevation[(b)]	Depth to Water	Water Elevation
MW-1	6/6/08	850672.2	1295502.4	2959.2	21.56	2937.6
MW-2	6/6/08	850686.5	1295757.3	2950.6	38.88	2911.7
MW-3	6/6/08	850585.4	1295469.9	2959.5	22.77	2936.7
MW-4	6/6/08	850535.0	1295799.8	2922.7	19.00	2903.7
MW-5	6/6/08	850453.1	1295402.0	2926.7	19.90	2906.8
MW-6	6/6/08	850510.7	1295589.1	2925.7	19.92	2905.8
MW-7	6/6/08	850492.9	1295907.8	2906.3	3.85	2902.5
MW-8	6/6/08	850532.3	1295672.6	2927.8	22.74	2905.1
MW9	6/6/08	850489.1	1295292.6	2939.3	26.86	2912.4
MW-10	6/6/08	850449.7	1295513.6	2918.5	14.29	2904.2
TW-1	6/6/08	850358.5	1295692.3	2898.9	3.18	2895.7
TW-2	6/6/08	850414.6	1295708.6	2905.8	7.21	2898.6
TW-3	6/6/08	850355.3	1295625.2	2898.9	4.02	2894.8
TW-4	6/6/08	850388.7	1295600.1	2902.2	3.97	2898.2
TW-5	6/6/08	850326.1	1295956.7	2899.3	4.56	2894.8
TW-6	6/6/08	850466.5	1296008.8	2901.6	2.35	2899.2
TW-7	6/6/08	850416.7	1295943.8	2900.3	1.90	2898.4
TW-8	6/6/08	850354.3	1295536.4	2899.4	NA	NA
TW-9	6/6/08	850373.9	1295536.9	2901.5	1.78	2899.8
TW-10	6/6/08	850402.1	1295696.6	2902.1	3.03	2899.1
TW-11	6/6/08	850370.0	1295746.3	2898.7	1.80	2896.9
TW-12	6/6/08	850357.5	1295844.4	2898.8	3.22	2895.6
TW-13	6/6/08	850349.9	1295806.5	2898.9	3.23	2895.6
P-1	6/6/08	850359.7	1295784.2	2899.0	4.09	2894.9
P-2	6/6/08	850368.1	1295781.3	2899.4	2.33	2897.1

Notes:
(a) Horizontal Datum - Montana Coordinate System NAD83, Single Zone
(b) Vertical Datum - NAVD 88

Table 2
Summary of LIF[(a)] Survey Data
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

LIF Boring Location	Easting[(b)]	Northing[(b)]	Surface Elevation[(c)]	Depth to Bedrock (bgs[(d)])	Bedrock Elevation[(c)]	Product Noted	Product Start Depth (bgs)	Product End Depth (bgs)	Product Thickness (feet)
1	850383.3	1295728.6	2898.7	13.28	2885.4	Y	1.6	2.6	1.0
2	850396.1	1295745.2	2899.8	10.79	2889.0	N	-	-	0.0
3	850404.6	1295728.0	2901.6	9.92	2891.7	Y	3.5	8.2	4.7
4	850420.2	1295730.1	2904.6	6.88	2897.8	Y	6.0	6.9	0.9
5	850428.5	1295706.1	2907.2	6.35	2900.9	N	-	-	0.0
6	850415.6	1295693.4	2902.6	7.09	2895.5	N	-	-	0.0
7	850400.8	1295705.0	2900.1	7.99	2892.1	Y	2.0	3.0	1.0
8	850370.6	1295707.6	2897.9	12.99	2884.9	N	-	-	0.0
9	850364.4	1295691.0	2897.7	9.71	2888.0	N	-	-	0.0
10	850347.3	1295680.6	2897.1	14.35	2882.7	N	-	-	0.0
11	850353.5	1295701.5	2897.6	13.54	2884.1	N	-	-	0.0
11A	850352.3	1295699.7	2897.7	NA	-	N	-	-	0.0
12	850356.8	1295766.9	2896.7	17.65	2879.0	N	-	-	0.0
13	850445.9	1295742.4	2910.5	9.10	2901.4	N	-	-	0.0
14	850437.8	1295752.8	2909.8	8.84	2901.0	N	-	-	0.0
15	850461.9	1295758.9	2912.6	5.14	2907.5	N	-	-	0.0
16	850479.3	1295743.9	2917.4	6.37	2911.0	N	-	-	0.0
17	850502.5	1295754.2	2920.4	6.81	2913.6	N	-	-	0.0
18	850516.3	1295729.5	2920.5	2.85	2917.7	N	-	-	0.0
19	850537.8	1295739.6	2924.8	1.60	2923.2	N	-	-	0.0
20	850544.9	1295708.6	2928.8	4.28	2924.5	N	-	-	0.0
21	850539.9	1295690.5	2928.7	3.25	2925.4	N	-	-	0.0
22	850349.7	1295898.6	2897.2	24.37	2872.8	N	-	-	0.0
23	850363.5	1295937.8	2898.1	22.38	2875.7	N	-	-	0.0
24	850400.6	1295951.8	2898.7	17.39	2881.3	N	-	-	0.0
25	850418.5	1295887.3	2898.9	5.10	2893.8	N	-	-	0.0
26	850386.9	1295908.4	2897.1	12.49	2884.6	N	-	-	0.0
27	850418.6	1295880.9	2898.9	5.65	2893.3	N	-	-	0.0
28	850440.1	1295895.3	2900.8	8.73	2892.0	N	-	-	0.0
29	850462.2	1295903.6	2903.4	4.50	2898.9	N	-	-	0.0
30	850482.8	1295890.2	2905.2	0.73	2904.4	N	-	-	0.0
31	850464.6	1295935.9	2901.9	1.83	2900.1	N	-	-	0.0
32	850483.6	1295929.6	2904.0	5.38	2898.6	N	-	-	0.0
33	850499.7	1295924.4	2906.0	7.97	2898.0	N	-	-	0.0
34	850406.1	1295792.3	2899.9	7.21	2892.7	N	-	-	0.0
35	850398.0	1295787.5	2899.3	7.60	2891.7	N	-	-	0.0
36	850409.7	1295772.1	2900.5	5.36	2895.2	Y	2.3	5.4	3.2
37	850393.6	1295773.6	2898.8	9.22	2889.5	MINOR EDGE	-	-	0.0
38	850416.8	1295796.4	2901.1	6.75	2894.3	Y	3.5	6.8	3.3
39	850423.7	1295779.0	2902.6	5.66	2896.9	Y	4.5	5.7	1.2
40	850417.7	1295813.1	2900.5	4.57	2895.9	POSSIBLE	3.0	4.6	1.6
41	850429.3	1295829.4	2901.9	4.88	2897.0	Y	3.0	4.9	1.9
42	850442.9	1295797.3	2904.6	3.58	2901.1	N	-	-	0.0
43	850440.5	1295779.6	2905.3	5.33	2900.0	N	-	-	0.0
44	850406.6	1295833.3	2899.0	9.10	2889.9	Y	2	2.5	0.5
45	850417.0	1295850.2	2899.7	5.60	2894.1	N	-	-	0.0
46	850419.3	1295862.6	2899.7	4.14	2895.6	N	-	-	0.0
47	850456.5	1295808.1	2906.4	0.35	2906.0	N	-	-	0.0
48	850470.8	1295777.7	2911.3	3.08	2908.3	N	-	-	0.0
49	850476.3	1295799.7	2911.4	0.91	2910.5	N	-	-	0.0
50	850498.3	1295806.7	2914.3	1.51	2912.8	N	-	-	0.0
51	850503.4	1295789.7	2916.6	0.67	2915.9	N	-	-	0.0
52	850520.9	1295795.4	2920.2	1.12	2919.1	N	-	-	0.0
53	850526.5	1295770.0	2923.0	2.25	2920.8	N	-	-	0.0
54	850554.4	1295816.4	2923.0	7.98	2915.0	N	-	-	0.0
55	850343.4	1295848.8	2897.0	25.43	2871.5	N	-	-	0.0
56	850355.3	1295803.8	2897.0	21.09	2875.9	N	-	-	0.0
57	850587.5	1295803.5	2925.2	3.08	2922.1	N	-	-	0.0
58	850614.6	1295851.3	2928.7	6.06	2922.6	N	-	-	0.0
59	850672.6	1295902.8	2929.5	0.31	2929.2	N	-	-	0.0
60	850662.8	1295850.5	2935.3	3.09	2932.2	N	-	-	0.0
61	850650.1	1295794.0	2941.4	2.39	2939.0	N	-	-	0.0
62	850645.4	1295751.8	2943.7	3.44	2940.2	N	-	-	0.0
63	850640.7	1295693.8	2948.8	6.58	2942.2	N	-	-	0.0
64	850354.5	1295649.3	2896.9	7.94	2888.9	N	-	-	0.0
65	850364.5	1295635.6	2897.7	8.44	2889.3	N	-	-	0.0
66	850386.4	1295625.8	2900.0	5.01	2895.0	N	-	-	0.0
67	850369.6	1295595.2	2898.7	4.33	2894.4	N	-	-	0.0
68	850387.3	1295604.4	2899.7	1.52	2898.2	N	-	-	0.0
69	850397.8	1295586.4	2901.8	3.80	2898.0	N	-	-	0.0
70	850420.1	1295580.4	2907.0	2.99	2904.0	N	-	-	0.0
71	850449.8	1295569.1	2916.7	6.52	2910.2	N	-	-	0.0
72	850465.9	1295596.1	2919.4	3.95	2915.4	N	-	-	0.0
73	850496.8	1295619.8	2925.4	5.22	2920.2	N	-	-	0.0
74	850503.1	1295653.0	2925.4	5.83	2919.5	N	-	-	0.0
75	850547.3	1295657.2	2932.0	0.30	2931.7	N	-	-	0.0
76	850588.3	1295647.1	2939.5	1.62	2937.8	N	-	-	0.0
77	850635.1	1295619.4	2955.7	2.93	2952.8	N	-	-	0.0
78	850411.7	1295553.3	2909.4	7.75	2901.7	NA	-	-	0.0
79	850450.3	1295550.5	2917.4	5.80	2911.6	NA	-	-	0.0
80	850455.0	1295485.7	2921.2	5.50	2915.7	NA	-	-	0.0
81	850501.4	1295461.6	2931.6	3.00	2928.6	NA	-	-	0.0
82	850527.1	1295508.6	2939.8	8.00	2931.8	NA	-	-	0.0
83	850572.4	1295538.0	2951.2	4.80	2946.4	NA	-	-	0.0
84	850616.7	1295545.0	2956.6	3.80	2952.8	NA	-	-	0.0

Notes:
(a) Lazer Induced Flourescence
(b) Horizontal Datum - Montana Coordinate System NAD83, Single Zone
(c) Vertical Datum - NAVD 88
(d) Below ground surface

Table 3
Summary of Ground Water Analytical Results (in µg/L)
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Well Name	Date Sampled	Petroleum Hydrocarbons [a]				Aromatic Hydrocarbons [a]							
		C9 to C10 Aromatics	C5 to C8 Aliphatics	C9 to C12 Aliphatics	Total Purgeable Hydrocarbons	Methyl tert-butyl ether	Benzene	Toluene	Ethylbenzene	m+p-Xylenes	o-Xylene	Total Xylenes	Napthalene
MW1	6/8/08	<20,000	121,000	15,000	189,000	<1,000	23,900	37,900	3,840	11,800	6,460	18,300	743
MW2	6/9/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
MW3	6/7/08	4,330	19,300	2,320	35,500	<100	3,030	7,360	905	3,320	1,380	4,700	284
MW4	6/7/08	TRACE PRODUCT - NO SAMPLE COLLECTED											
MW5	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
MW6	6/7/08	523	3,720	472	6,760	<10	641	1,550	140	640	268	908	41
MW7	6/7/08	988	8,530	744	15,900	<50	1,690	4,200	333	1,350	661	2,010	111
MW8	6/7/08	4,760	33,700	3,890	60,600	<100	5,900	13,800	1,320	5,590	2,230	7,820	428
MW9	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
MW10	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW1	6/8/08	140	418	128	714	<1	51	91	6	22	9	31	1.3
TW2	6/8/08	4,340	18,700	2,910	41,200	<100	6,170	10,300	735	3,700	1,830	5,530	296
TW3	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW4	6/8/08	1,210	10,300	1,100	19,000	<30	2,190	4,690	236	1,760	766	2,520	123
TW5	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW6	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW7	6/8/08	<20	<20	<20	<20	<1	<0.5	2.2	0.38	2.2	0.6	2.8	<1
TW8	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW9	6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
TW10	6/8/08	6,350	61,200	5,820	110,000	<150	12,100	27,400	2,440	9,640	3,910	13,600	735
TW11	6/8/08	8,830	75,000	6,220	147,000	<300	22,200	39,800	3,250	11,700	4,760	16,500	867
TW12	6/8/08	<20	23	<20	43	<1	10	10	<0.5	1.9	1	2.9	<1
TW13	6/8/08	<20	139	38	280	<1	56	54	2.3	22	18	40	1.2
P4	6/8/08	166	1,040	140	2,290	<5	366	629	52.0	191	105	296	16

Notes:
(a) Analyzed using Method MA-VPH

Table 4

Summa Canister Air Sampling Results for June 7, 2008 in ppb v/v[(a)]
Arnold Residence
Mile Marker 5.2 Mt Highway 35
Polson, Montana

	Analyte	Location			
		Arnold Basement	Arnold Main Floor	Background 1	Background 2
Potential Fuel-related Compounds	1,2,4-Trimethylbenzene	**33**	**4.9**	<0.224	**0.73**
	1,3,5-Trimethylbenzene	**24**	**3.7**	<0.248	**0.25**
	4-Ethyl toluene	**15**	**2.4**	<0.183	**0.24**
	Benzene	**670**	**200**	<0.314	**1.4**
	Butane	**180**	**190**	ND	**2.7**
	Butane, 2,3-dimethyl-	**180**	**160**	ND	ND
	Butane, 2-methyl-	**480**	**620**	ND	**12**
	C7 Hydrocarbon	**690**	**710**	ND	ND
	Cyclohexane	**830**	**370**	<0.359	**0.56**
	Cyclopentane, methyl-	**220**	**200**	ND	ND
	Ethanol	ND	**160**	**1.1**	**12**
	Ethylbenzene	**86**	**17**	<0.307	**0.58**
	Heptane	**590**	**240**	<0.302	**0.64**
	Heptane, 3-methyl-	**200**	ND	ND	ND
	Hexane	**3800**	**2200**	<0.287	**2.6**
	Hexane, 2,4-dimethyl	**190**	**140**	ND	ND
	Hexane, 2-methyl-	**290**	**220**	ND	ND
	Hexane, 3-methyl-	**310**	**270**	ND	ND
	m,p-Xylene	**380**	**69**	<0.520	**2**
	o-Xylene	**150**	**24**	<0.262	**0.74**
	Pentane	**380**	**380**	ND	**8.4**
	Pentane, 2,3,4-trimethyl-	**730**	**380**	ND	ND
	Pentane, 2,3-dimethyl-	**610**	**570**	ND	ND
	Pentane, 2-methyl-	**260**	**290**	ND	**3**
	Pentane, 3-methyl-	**190**	**190**	ND	ND
	Toluene	**1000**	**270**	**0.63**	**5.4**
Non Fuel-Related Compounds	Acetone	<2.0	<2.0	<0.195	**3.9**
	Carbon Disulfide	<3.9	<3.9	<0.388	**0.55**
	Chloromethane	<4.1	<4.1	**0.63**	**0.67**
	Dichlorodifluoromethane	<4.3	<4.3	**0.48**	**0.49**
	Ethyl Acetate	<2.6	<2.6	<0.261	**1.7**
	Methylene Chloride	<3.4	<3.4	<0.339	**1.5**

(a) Parts per billion, volume/volume basis
Bold - Detected Compound

Table 5

Summa Canister Air Sampling Results for June 7, 2008 in ppb v/v[a]
Kohler Residence
Mile Marker 5.2 Mt Highway 35
Polson, Montana

	Analyte	Location			
		Kohler Basement	Kohler Main Floor	Background 1	Background 2
Potential Fuel-Related Compounds	1,2,4-Trimethylbenzene	**26**	**4**	<0.224	**0.73**
	1,3,5-Trimethylbenzene	**9.4**	**1.5**	<0.248	**0.25**
	1-Butene, 2-methyl-	**140**	**16**	ND	ND
	2-Butene, 2-methyl-	**190**	**21**	ND	ND
	4-Ethyl toluene	**6.4**	**1**	<0.183	**0.24**
	Benzene	**66**	**11**	<0.314	**1.4**
	Butane	**720**	**63**	ND	**2.7**
	Butane, 2,3-dimethyl-	**260**	**28**	ND	ND
	Butane, 2-methyl-	**1500**	**120**	ND	**12**
	C7 Hydrocarbon	**370**	**48**	ND	ND
	Cyclohexane	**160**	**35**	<0.359	**0.56**
	Cyclopentane, methyl-	**210**	**23**	ND	ND
	Ethanol	**99**	**120**	**1.1**	**12**
	Ethylbenzene	**3.3**	**0.64**	<0.307	**0.58**
	Heptane	**36**	**6.7**	<0.302	**0.64**
	Hexane	**830**	**180**	<0.287	**2.6**
	Hexane, 3-methyl-	**120**	ND	ND	ND
	Isobutane	**360**	**38**	ND	ND
	m,p-Xylene	**12**	**2.5**	<0.520	**2**
	o-Xylene	**7**	**1.4**	<0.262	**0.74**
	Pentane	**830**	**71**	ND	**8.4**
	Pentane, 2,3-dimethyl-	**410**	**39**	ND	ND
	Pentane, 2-methyl-	**420**	**44**	ND	**3**
	Pentane, 3-methyl-	**260**	**26**	ND	ND
	Toluene	**110**	**20**	**0.63**	**5.4**
Non Fuel-Related Compounds	Acetone	<2.0	<0.195	<0.195	**3.9**
	Carbon Disulfide	<3.9	<0.388	<0.388	**0.55**
	Chloromethane	<4.1	**0.63**	**0.63**	**0.67**
	Dichlorodifluoromethane	**17**	**3.7**	**0.48**	**0.49**
	Ethyl Acetate	<2.6	**1.7**	<0.261	**1.7**
	Freon 11	<3.8	**0.43**	<0.384	<0.384
	Methylene Chloride	**41**	**9.5**	<0.339	**1.5**

(a) Parts per billion, volume/volume basis
Bold - Detected Compound

Table 6

Summa Canister Air Sampling Results for June 7, 2008 in ppb v/v[(a)]
Jones Residence
Mile Marker 5.2 Mt Highway 35
Polson, Montana

	Analyte	**Location**			
		Jones Basement	**Jones Main Floor**	**Background 1**	**Background 2**
Potential Fuel-Related Compounds	1,2,4-Trimethylbenzene	**3.8**	**5.2**	<0.224	**0.73**
	1,3,5-Trimethylbenzene	**1.3**	**1.7**	<0.248	**0.25**
	2-Butene, 2-methyl-	**19**	**16**	ND	ND
	4-Ethyl toluene	**0.97**	**1.4**	<0.183	**0.24**
	Benzene	**4.1**	**5.7**	<0.314	**1.4**
	Butane	**97**	**110**	ND	**2.7**
	Butane, 2,2-dimethyl-	**16**	**12**	ND	ND
	Butane, 2,3-dimethyl-	ND	**35**	ND	ND
	Butane, 2-methyl-	**190**	**230**	ND	**12**
	C7 Hydrocarbon	**69**	**43**	ND	ND
	Cyclohexane	**35**	**14**	<0.359	**0.56**
	Cyclopentane, methyl-	**34**	**26**	ND	ND
	Ethanol	**97**	**100**	**1.1**	**12**
	Ethylbenzene	**2.5**	**3.3**	<0.307	**0.58**
	Heptane	**3.4**	**3.2**	<0.302	**0.64**
	Hexane	**96**	**56**	<0.287	**2.6**
	Isobutane	**75**	**67**	ND	ND
	m,p-Xylene	**10**	**14**	<0.520	**2**
	o-Xylene	**4**	**5.4**	<0.262	**0.74**
	Pentane	**98**	**110**	ND	**8.4**
	Pentane, 2,3,4-trimethyl-	**24**	**13**	ND	ND
	Pentane, 2,3-dimethyl-	**51**	**37**	ND	ND
	Pentane, 2-methyl-	**61**	**50**	ND	**3**
	Pentane, 3-methyl-	**38**	**30**	ND	ND
	Propane, 2,2-dimethyl-	**16**	ND	ND	ND
	Toluene	**16**	**21**	**0.63**	**5.4**
Non Fuel-Related Compounds	2-Butanone	**17**	**11**	<0.248	<0.248
	Acetone	<0.195	<0.195	<0.195	**3.9**
	Carbon Disulfide	<0.388	<0.388	<0.388	**0.55**
	Chloromethane	**1.1**	**0.96**	**0.63**	**0.67**
	Dichlorodifluoromethane	**0.49**	**0.5**	**0.48**	**0.49**
	Ethyl Acetate	<0.261	**0.91**	<0.261	**1.7**
	Isopropyl Alcohol	ND	**10**	ND	ND
	Methylene Chloride	<0.339	<0.339	<0.339	**1.5**
	Styrene	**1.4**	**1.2**	<0.227	<0.227
	Tetrahydrofuran	**8.2**	**1.1**	<0.350	<0.350

(a) Parts per billion, volume/volume basis
Bold - Detected Compound

Table 7

Summa Canister Air Sampling Results for June 7, 2008 in ppb v/v[(a)]
Sykes Residence
Mile Marker 5.2 Mt Highway 35
Polson, Montana

	Analyte	Location			
		Sykes Basement	Sykes Main Floor	Background 1	Background 2
Potential Fuel-Related Compounds	1,2,4-Trimethylbenzene	**0.31**	**0.24**	<0.224	**0.73**
	1,3,5-Trimethylbenzene	<0.248	<0.248	<0.248	**0.25**
	2-Butene, 2-methyl-	**14**	**11**	ND	ND
	4-Ethyl toluene	<0.183	<0.183	<0.183	**0.24**
	Benzene	**11**	**3.7**	<0.314	**1.4**
	Butane	**41**	**39**	ND	**2.7**
	Butane, 2,3-dimethyl-	**18**	**14**	ND	ND
	Butane, 2-methyl-	**95**	**120**	ND	**12**
	C7 Hydrocarbon	**31**	**19**	ND	ND
	Cyclohexane	**26**	**8.5**	<0.359	**0.56**
	Cyclopentane, methyl-	**17**	**13**	ND	ND
	Ethanol	**18**	**52**	**1.1**	**12**
	Ethylbenzene	**1.9**	**0.77**	<0.307	**0.58**
	Heptane	**11**	**5.3**	<0.302	**0.64**
	Hexane	**190**	**67**	<0.287	**2.6**
	Hexane, 3-methyl-	**15**	**11**	ND	ND
	Isobutane	**17**	**15**	ND	ND
	m,p-Xylene	**6**	**2.3**	<0.520	**2**
	o-Xylene	**1.5**	**0.63**	<0.262	**0.74**
	Pentane	**57**	**65**	ND	**8.4**
	Pentane, 2,3-dimethyl-	**32**	**19**	ND	ND
	Pentane, 2-methyl-	**33**	**28**	ND	**3**
	Pentane, 3-methyl-	**19**	**15**	ND	ND
	Toluene	**12**	**5.7**	**0.63**	**5.4**
Non Fuel-Related Compounds	1,1,1-Trichloroethane	<0.321	**0.55**	<0.321	<0.321
	2-Butanone	**6.9**	**5.1**	<0.248	<0.248
	Acetone	<0.195	<0.195	<0.195	**3.9**
	Carbon Disulfide	<0.388	<0.388	<0.388	**0.55**
	Chloromethane	<0.405	<0.405	**0.63**	**0.67**
	Dichlorodifluoromethane	**3.3**	**3.5**	**0.48**	**0.49**
	Ethane, 1-chloro-1,1-difluoro-	**14**	**18**	ND	ND
	Ethyl Acetate	<0.261	<0.261	<0.261	**1.7**
	Freon 11	**4.1**	**4**	<0.384	<0.384
	Isopropyl Alcohol	ND	**30**	ND	ND
	Methylene Chloride	<0.339	<0.339	<0.339	**1.5**
	Styrene	**0.25**	<0.277	<0.277	<0.277
	Tetrahydrofuran	**6.9**	**1.8**	<0.350	<0.350

(a) Parts per billion, volume/volume basis
Bold - Detected Compound

Table 8

Summa Cannister Air Sampling Results for June 7, 2008 in ppb v/v[a]
Rothwell Residence
Mile Marker 5.2 Mt Highway 35
Polson, Montana

	Analyte	Location			
		Knudson Basement	Knudson Main Floor	Background 1	Background 2
Potential Fuel-Related Compound	1,2,4-Trimethylbenzene	**0.43**	**0.41**	<0.224	**0.73**
	1,3,5-Trimethylbenzene	<0.248	<0.248	<0.248	**0.25**
	4-Ethyl toluene	<0.183	<0.183	<0.183	**0.24**
	Benzene	<0.314	<0.314	<0.314	**1.4**
	Butane	**3.3**	**3.6**	ND	**2.7**
	Butane, 2-methyl-	ND	ND	ND	**12**
	C11 Hydrocarbon	**2.3**	**2.4**	ND	ND
	Cyclohexane	<0.359	<0.359	<0.359	**0.56**
	Decane	**2.3**	ND	ND	ND
	Ethanol	**49**	**55**	**1.1**	**12**
	Ethylbenzene	**1.4**	**1.4**	<0.307	**0.58**
	Heptane	**0.35**	**0.38**	<0.302	**0.64**
	Hexanal	**4**	**4.3**	ND	ND
	Hexane	**0.34**	**0.36**	<0.287	**2.6**
	Isobutane	**6.3**	**6.7**	ND	ND
	m,p-Xylene	**4.7**	**4.9**	<0.520	**2**
	o-Xylene	**2.3**	**2.2**	<0.262	**0.74**
	Pentane	ND	ND	ND	**8.4**
	Pentane, 2-methyl-	ND	ND	ND	**3**
	Toluene	**2.3**	**2.4**	**0.63**	**5.4**
	.alpha.-Pinene	**3.3**	**3.4**	ND	ND
	1,1-Dichloro-1-Fluoroethane	**2.5**	**2.4**	ND	ND
Non Fuel-Related Compounds	2-Butanone	**22**	**21**	<0.248	<0.248
	4-Heptanone, 2,6-dimethyl-	**3.3**	ND	ND	ND
	Acetone	**40**	**43**	<0.195	**3.9**
	Carbon Disulfide	<0.388	<0.388	<0.388	**0.55**
	Chloromethane	<0.405	<0.405	**0.63**	**0.67**
	Dichlorodifluoromethane	**0.52**	**0.49**	**0.48**	**0.49**
	Ethane, 1-chloro-1,1-difluoro-	**50**	**49**	ND	ND
	Ethyl Acetate	**0.28**	**0.31**	<0.261	**1.7**
	Isopropyl Alcohol	**3**	**3.4**	ND	ND
	Methylene Chloride	**0.36**	**0.35**	<0.339	**1.5**
	Styrene	**1.2**	**1.2**	<0.227	<0.227
	Tetrahydrofuran	**3.4**	**3.6**	<0.350	<0.350

(a) Parts per billion, volume/volume basis
Bold - Detected Compound

Table 9
Summary of Potentially Applicable Cleanup Levels for Air, Soil, and Ground Water
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Compound	CAS #	Air Cleanup Levels(a)		Soil Cleanup Levels(b)	Ground Water Cleanup Levels	
					PRGs(c)	MCLs(d)
		ug/m^3	ppb, V/V	mg/kg	μg/L	μg/L
Gasoline-Range Organics	---	NVE	NVE	NVE	NVE	NVE
Benzene*	71-43-2	0.31	0.098	1.1	0.41	5
Toluene	108-88-3	400	110	5,000	2,300	1,000
Ethylbenzene*	100-41-4	2.2	0.51	5.7	1.5	700
Xylene, mixture	1330-20-7	NVE	NVE	600	200	10,000
m-Xylene	108-38-3	7,000	1,600	4,500	1,400	NVE
p-Xylene	106-42-3	7,000	1,600	4,700	1,500	NVE
o-Xylene	95-47-6	7,000	1,600	5,300	1,400	NVE
Naphthalene	91-20-3	3.0	0.57	150	6.2	NVE
Methyl tert-butyl ether (MTBE)*	1634-04-4	3,000	830	39	12	NVE
Hexane	110-54-3	200	57	570	880	NVE
Cyclohexane	110-82-7	NVE	NVE	7,200	13,000	NVE
Ethanol	64-17-5	NVE	NVE	NVE	NVE	NVE
1,2-Dibromoethane*	106-93-4	0.011	0.0014	0.034	0.0065	0.05
1,2-Dichloroethane*	107-06-2	0.094	0.023	0.45	0.15	5
1,2,4-Trimethylbenzene	95-63-6	6.0	1.2	67	15	NVE
1,3,5-Trimethylbenzene	108-67-8	6.0	1.2	NVE	NVE	NVE

(a) Office of Solid Waste and Emergency Response
(b) EPA Region 9 Preliminary Remediation Goals based on residential use and protection of ground water as a drinking water source. Combined risk for ingestion and inhalation.
(c) EPA Region 9 Preliminary Remediation goals for ground water based on human ingestion
(d) EPA Maximum Contaminant Levels
NVE - No Value Established
* - Known or suspected human carcinogen

Table 10
Summary of Current Sampling Frequency and Requested Analysis
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Sample Location	Current Frequency		Analysis Requested	
	Daily	Monthly	Petroleum Hydrocarbons-Volatile[a]	VOCs[b]
Supply Well	X		X	X
Cistern	X		X	X
Post Pressure Tank	X		X	X
System Influent	X		X	
System Post Sparge	X		X	
Carbon Mid-Barrel	X		X	
System Effluent	X		X	
N1430	X		X	
S310	X		X	
MW1		X	X	
MW2	X		X	X
MW3		X	X	
MW4		X	X	
MW5		X	X	
MW6		X	X	
MW7		X	X	
MW8		X	X	
MW9		X	X	
MW10		X	X	
TW1		X	X	
TW2		X	X	
TW3		X	X	
TW4		X	X	
TW5		X	X	
TW6		X	X	
TW7		X	X	
TW8		X	X	
TW9		X	X	
TW10		X	X	
TW11		X	X	
TW12		X	X	
TW13		X	X	
P4		X	X	
Lagoon 1	X		X	
Lagoon 2	X		X	
Lagoon 3	X		X	

Notes:
(a) Using MA-VPH Analytical Methods
(b) Volatile Organic Compounds by EPA Method E524.2

Table 11
Summary of Proposed Sampling Frequency and Proposed Analysis
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Sample Location	Proposed Frequency				Proposed Analysis		
	Monday, Wednesday, and Friday	Monday and Thursday	Weekly	Monthly	Gasoline-Range Petroleum Hydrocarbons[(a)]	Total Purgeable Hydrocarbons[(b)]	BTEX[(c)]
Supply Well		X				X	
Post Pressure Tank		X				X	
System Influent	X(d)				X		X
System Post Sparge	X(d)				X		X
Carbon Mid-Barrel	X(d)				X		X
System Effluent	X(d)				X		X
N1430			X				X
S310			X				X
MW1				X	X		X
MW2	X			X	X		X
MW3				X	X		X
MW4				X	X		X
MW5				X	X		X
MW6				X	X		X
MW7				X	X		X
MW8				X	X		X
MW9				X	X		X
MW10				X	X		X
TW1				X	X		X
TW2				X	X		X
TW3				X	X		X
TW4				X	X		X
TW5				X	X		X
TW6				X	X		X
TW7				X	X		X
TW8				X	X		X
TW9				X	X		X
TW10				X	X		X
TW11				X	X		X
TW12				X	X		X
TW13				X	X		X
P4				X			X
Lagoon 1			X				X
Lagoon 2			X				X
Lagoon 3			X				X
Lagoon 4			X				X
Lagoon 5			X				X

Notes:
(a) Using NWTPH-Gx Analytical Methods
(b) Total Purgeable Hydrocarbons by MA-VPH Methods. Anaylsis includes, but not is not limited to, gaoline-range petroleum hydrocarbons and aromatic fuel compounds
(c) Benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8021B
(d) Sampling and analysis reduced to weekly after establishing compliance for 4 consecutive weeks
(e) VOCs analyzed for the Monday, Wednesday, and Friday sampling events

Table 12
Summary of Water Supply Analytical Results (in µg/L); Supply Well
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Date Sampled	Petroleum Hydrocarbons [a]				Aromatic Hydrocarbons [a]								Detected VOCs [b]
	C9 to C10 Aromatics	C5 to C8 Aliphatics	C9 to C12 Aliphatics	Total Purgeable Hydrocarbons	Methyl tert-butyl ether	Benzene	Toluene	Ethylbenzene	m+p-Xylenes	o-Xylene	Total Xylenes	Napthalene	Chloromethane
6/2/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	1.9
6/4/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/5/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/6/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/7/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/9/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/10/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/11/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/12/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/13/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/14/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/16/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	0.6
6/17/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/18/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/19/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/20/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/21/08	<20	<20	20	22	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/23/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5

Notes:
(a) Analyzed using Method MA-VPH
(b) Analyzed using Method E524.2

Table 13
Summary of Water Supply Analytical Results (in µg/L); Cistern Samples
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Date Sampled	Petroleum Hydrocarbons [a]				Aromatic Hydrocarbons [a]								Detected VOCs [b]
	C9 to C10 Aromatics	C5 to C8 Aliphatics	C9 to C12 Aliphatics	Total Purgeable Hydrocarbons	Methyl tert-butyl ether	Benzene	Toluene	Ethylbenzene	m+p-Xylenes	o-Xylene	Total Xylenes	Napthalene	Chloromethane
6/2/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/4/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/5/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/6/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/7/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/9/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/10/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/11/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/12/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/13/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/14/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/16/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	0.6

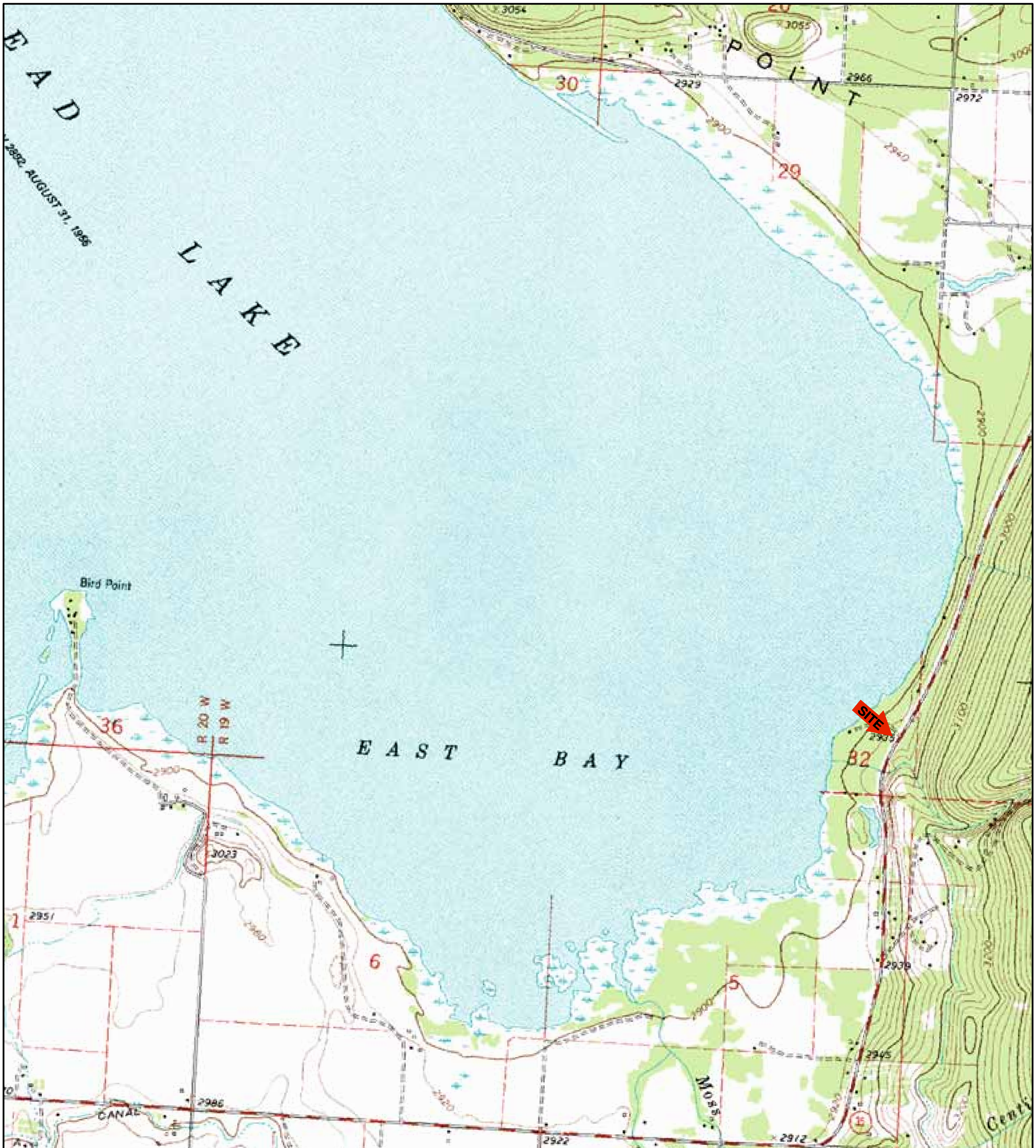
Notes:
(a) Analyzed using Method MA-VPH
(b) Analyzed using Method E524.2

Table 14
Summary of Water Supply Analytical Results (in µg/L); System Discharge
Keller Transport Spill Site
Mile Marker 5.2 Highway 35
Polson, Montana

Date Sampled	Petroleum Hydrocarbons [a]				Aromatic Hydrocarbons [a]								Detected VOCs [b]
	C9 to C10 Aromatics	C5 to C8 Aliphatics	C9 to C12 Aliphatics	Total Purgeable Hydrocarbons	Methyl tert-butyl ether	Benzene	Toluene	Ethylbenzene	m+p-Xylenes	o-Xylene	Total Xylenes	Napthalene	Chloromethane
6/2/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	1.8
6/4/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/5/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/6/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/7/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/8/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/9/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/10/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/11/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/12/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/13/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/14/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/16/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	0.77
6/17/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/18/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/19/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/20/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/21/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5
6/23/08	<20	<20	<20	<20	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5

Notes:
(a) Analyzed using Method MA-VPH

Figures



KEY:

SOURCE: USGS 7.5 MINUTE QUADRANGLE (TOPOGRAPHIC)

EAST BAY, MONT.
1958

REVISED 1964

SCALE = 1:24,000

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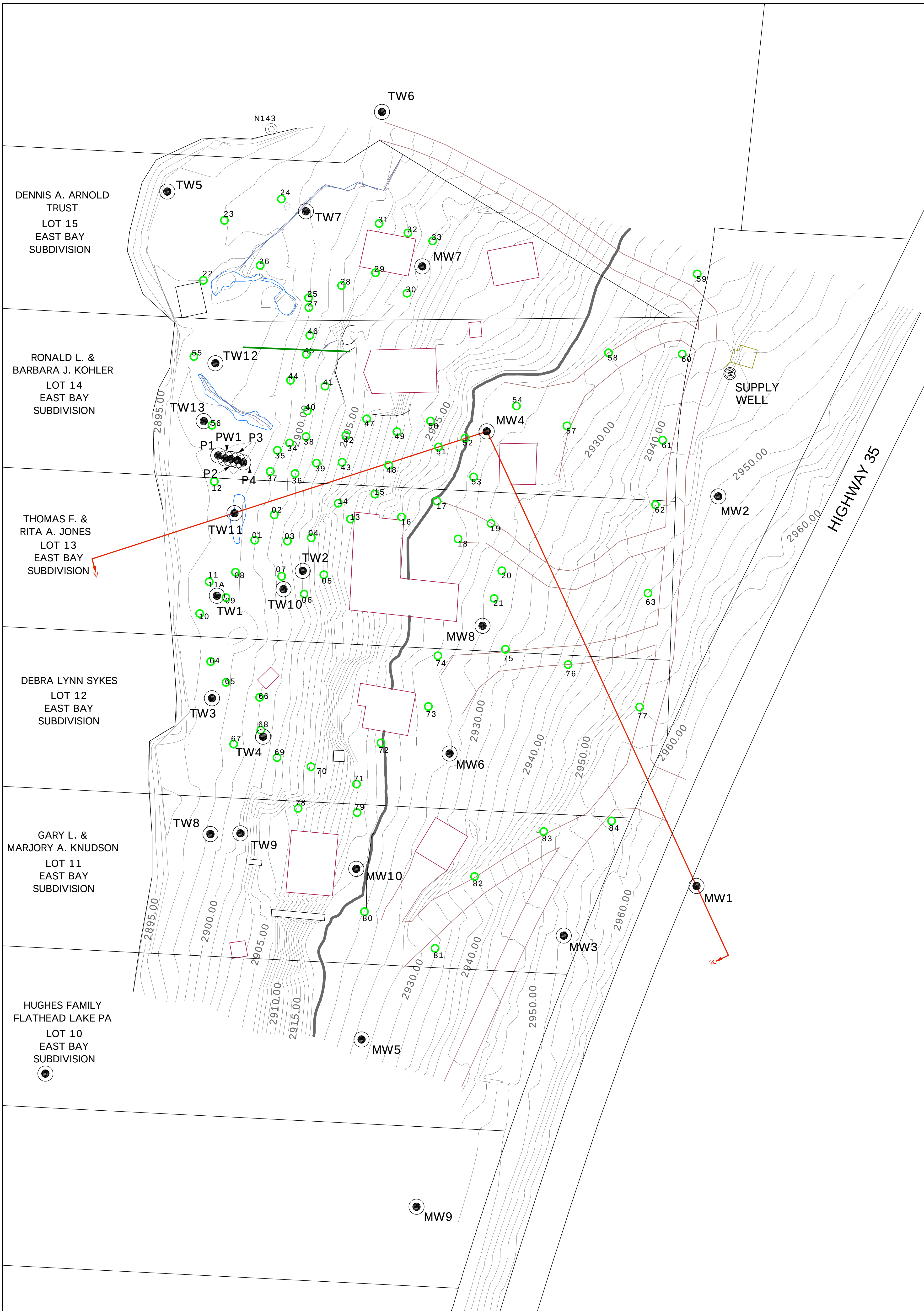
FIGURE 1

GENERAL VICINITY MAP

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/26/08



KEY:

MW-3 MONITORING WELL LOCATION

30 LIF BORING LOCATION

0 15 30 60

SCALE: 1" = 60"

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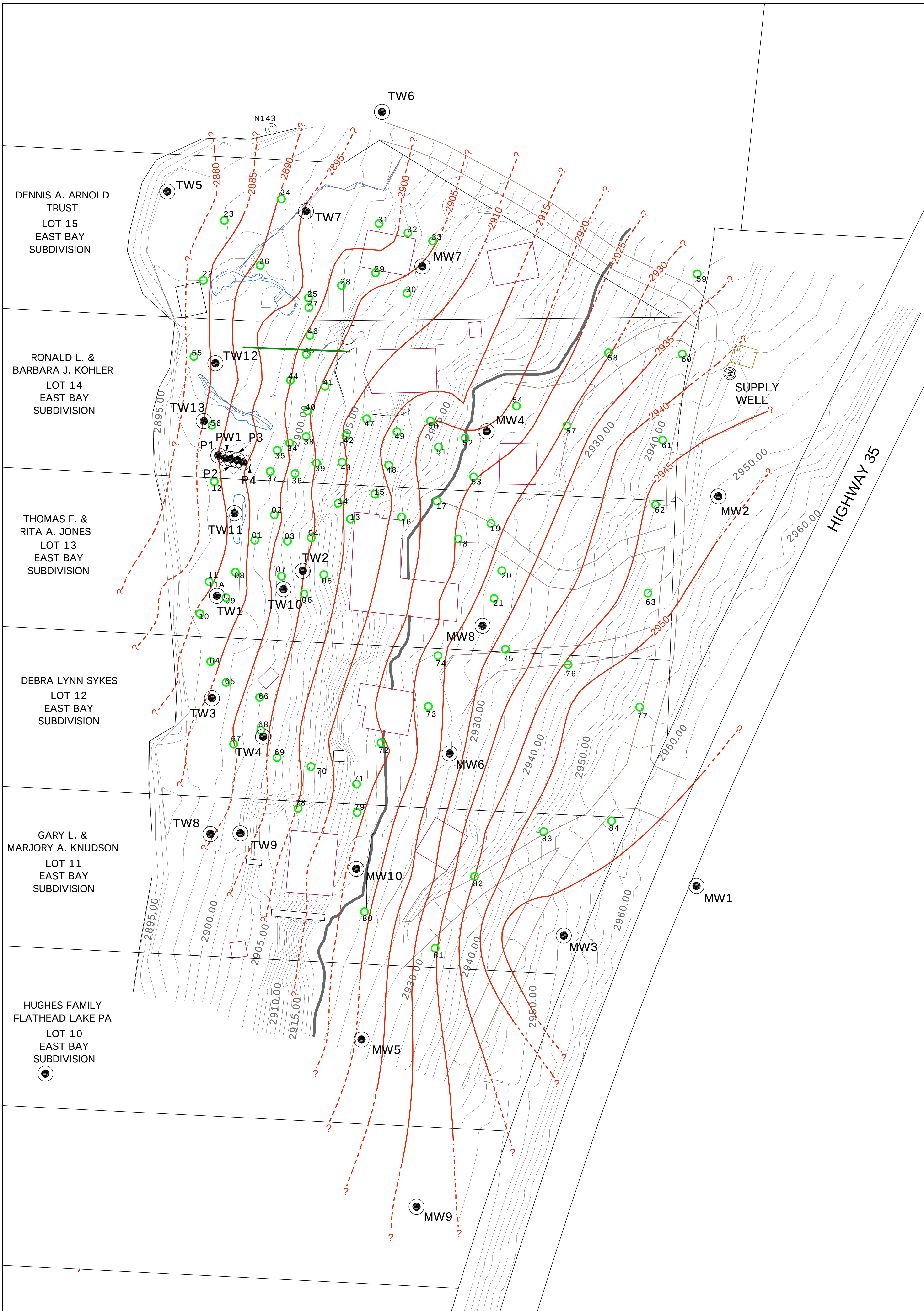
FIGURE 2

SITE REPRESENTATION WITH
TOPOGRAPHIC ELEVATION CONTOURS

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

MW-3 MONITORING WELL LOCATION

30 LIF BORING LOCATION

?- - - BEDROCK SURFACE ELEVATION CONTOUR IN FEET, DASHED WHERE INFERRED, QUERRIED WHERE UNCERTAIN

0 15 30 60

SCALE: 1" = 60'

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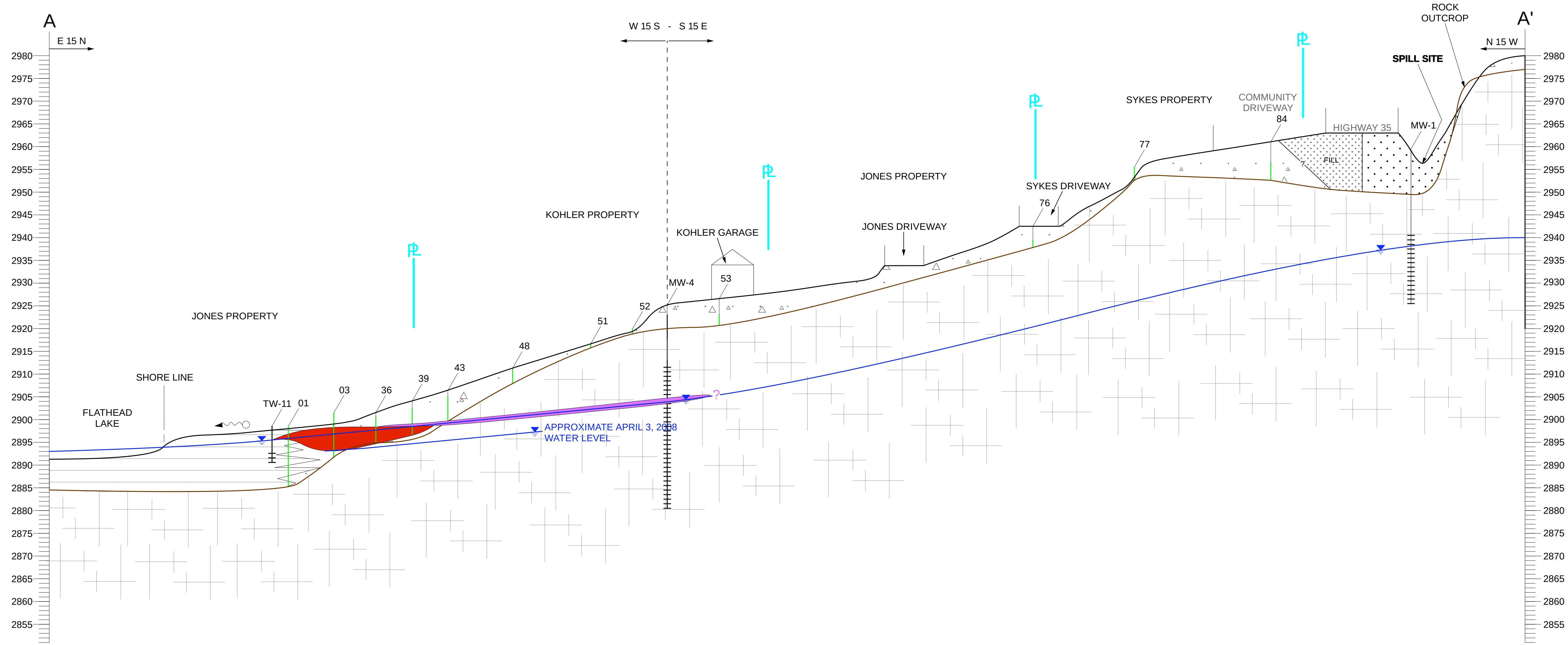
FIGURE 3

BEDROCK SURFACE ELEVATIONS

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



NOTES:

- SEPARATE-PHASE HYDROCARBONS IN SOIL BASED ON LIF INVESTIGATION
- POTENTIAL SEPARATE-PHASE HYDROCARBON ON GROUND WATER
- LIMESTONE/DOLOMITE BEDROCK
- LACUSTRINE SEDIMENT
- UPLAND COLLUVIUM
- STRATIGRAPHIC FACIES BETWEEN LACUSTRINE AND COLLUVIAL SEDIMENTS (LOCATION VARIABLE)
- INTERIM REMEDIAL ACTION EXCAVATION
- OVERLAND SEEP (LOCATIONS VARIABLE)

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA
SHEET	1 of 1
DRAWN BY	ARM
REVIEWED BY	EMK
DATE	06/25/08

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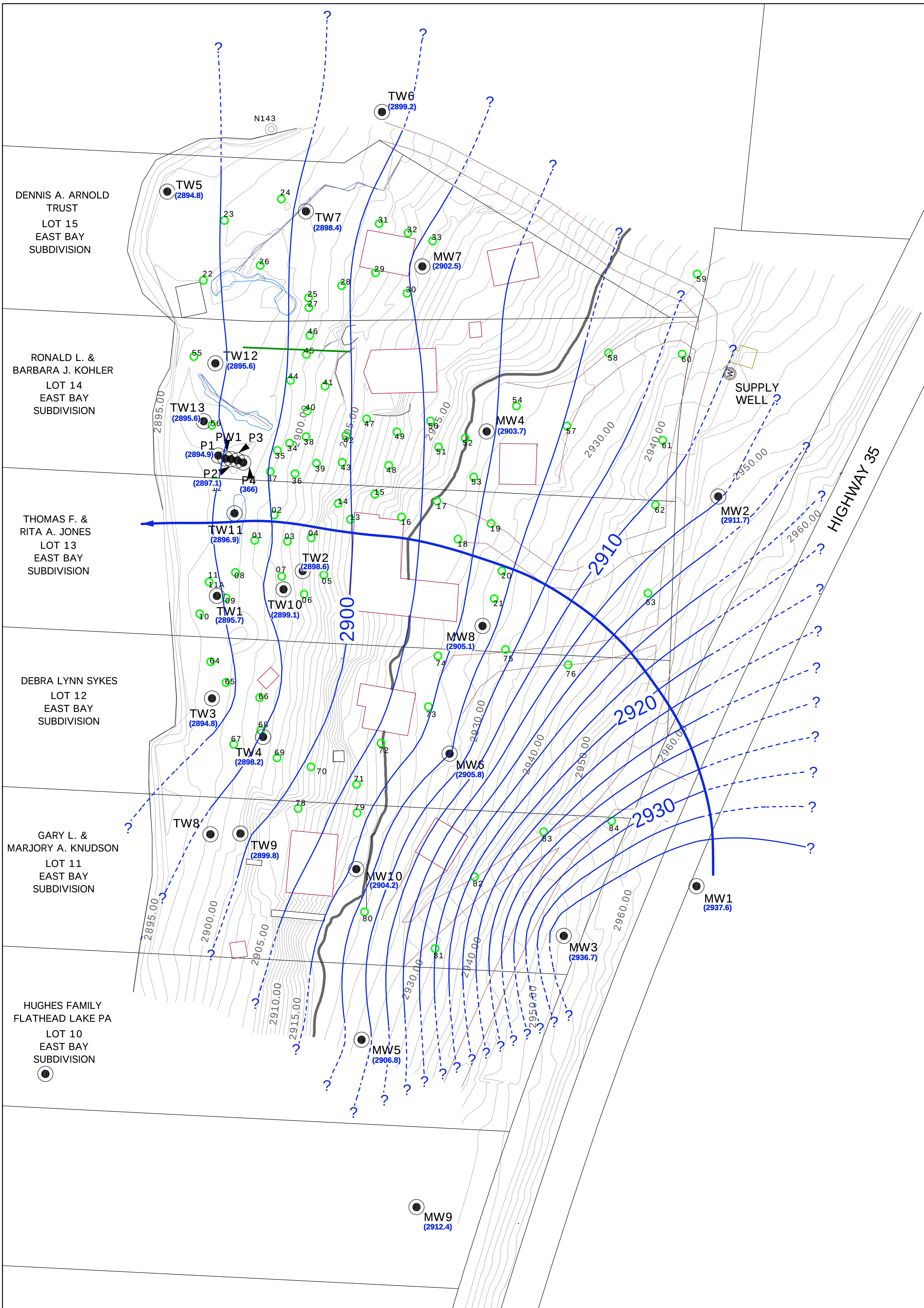
FIGURE 4

INTERPRETIVE CROSS-SECTION A - A'

HORIZONTAL SCALE: 1" = 50'
0 12.5 25 50

VERTICAL SCALE: 1" = 25'
2X VERTICAL EXAGERATION
0 6.25 12.5 25

KEY:



MW-3 (2936.7) MONITORING WELL LOCATION WITH GROUND WATER ELEVATION IN FEET

30 LIF BORING LOCATION

? GROUND WATER ELEVATION CONTOUR IN FEET, DASHED WHERE INFERRED, QUERRIED WHERE UNCERTAIN

GROUND WATER FLOW

0 15 30 60

SCALE: 1" = 60'

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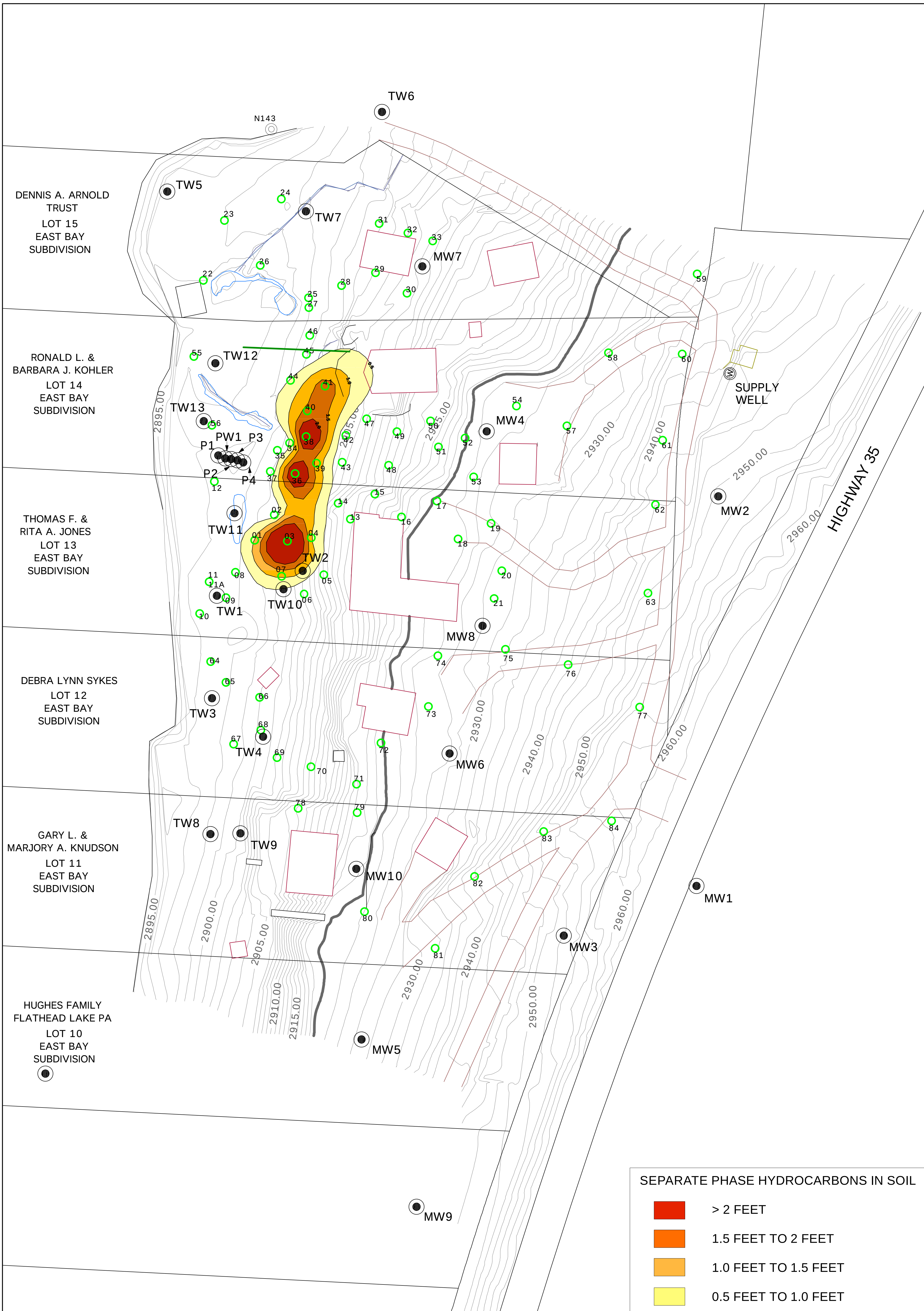
FIGURE 5

PIEZOMETRIC CONTOURS FOR
JUNE 6, 2008

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

MW-3 MONITORING WELL LOCATION

30 LIF BORING LOCATION

(a) SEPARATE PHASE HYDROCARBONS

0 15 30 60

SCALE: 1" = 60'

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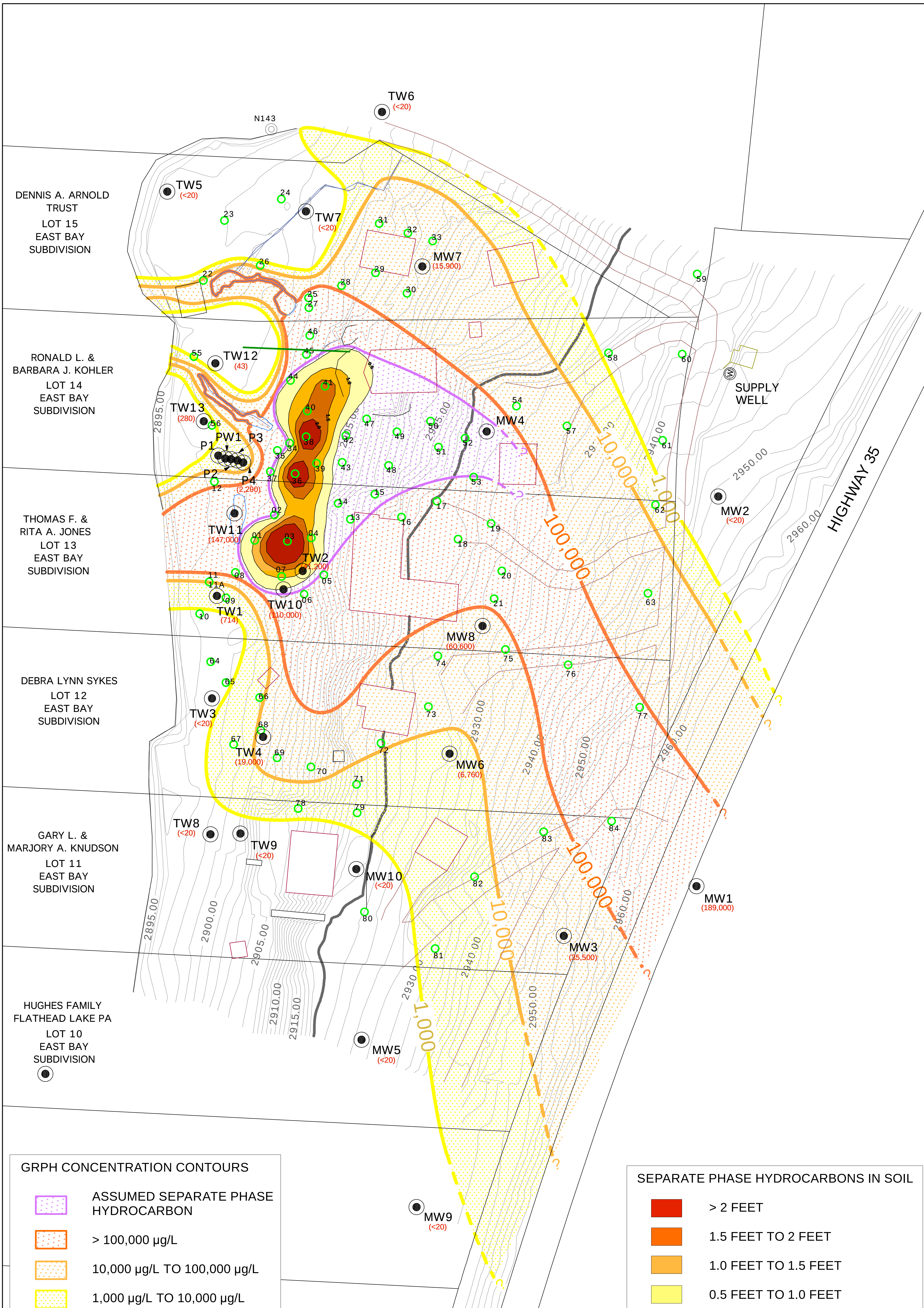
FIGURE 6

DISTRIBUTION OF SPH[(a)] IN SOIL

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

MW-3 (35,500) — MONITORING WELL LOCATION WITH GRPH CONCENTRATION IN µg/L

30 — LIF BORING LOCATION

GRPH CONCENTRATION CONTOUR IN µg/L, DASHED WHERE INFERRED, QUERRIED WHERE UNCERTAIN

(a) GASOLINE-RANGE PETROLEUM HYDROCARBONS AS INDICATED BY TOTAL PURGEABLE HYDROCARBONS IN THE VOLATILE RANGE USING MA-VPH ANALYTICAL METHODS

0 15 30 60

SCALE: 1" = 60"

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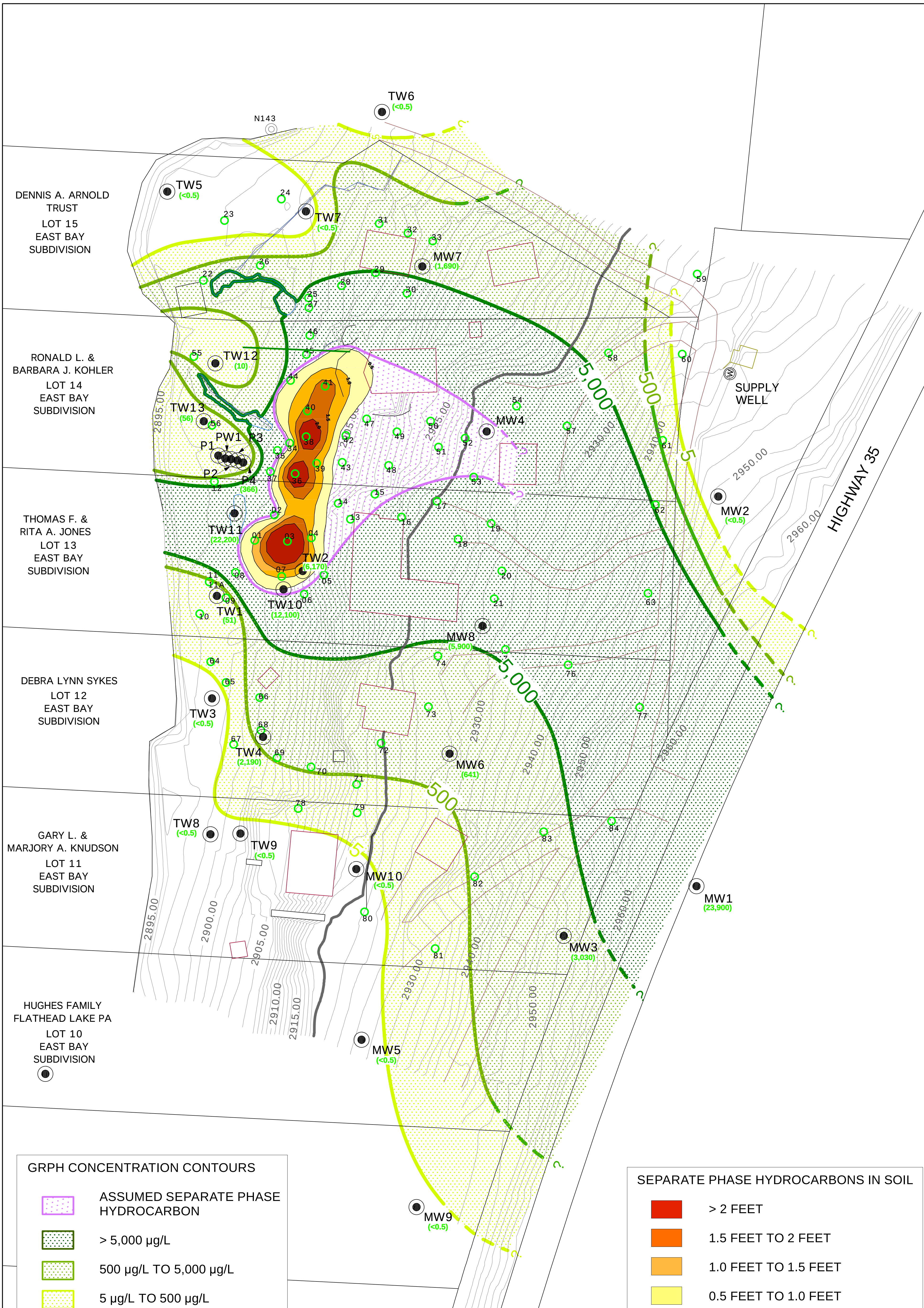
FIGURE 7

DISTRIBUTION OF GRPH[(a)] IN SHALLOW GROUND WATER, JUNE 7 THROUGH JUNE 9, 2008

PROJECT	56401.1		
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP		
LOCATION	HIGHWAY 35 POLSON, MONTANA		
SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

MW-3 (3,030) MONITORING WELL LOCATION WITH BENZENE CONCENTRATION IN µg/L

30 LIF BORING LOCATION

BENZENE CONCENTRATION CONTOUR IN µg/L, DASHED WHERE INFERRED, QUERRIED WHERE UNCERTAIN

0 15 30 60

SCALE: 1" = 60'

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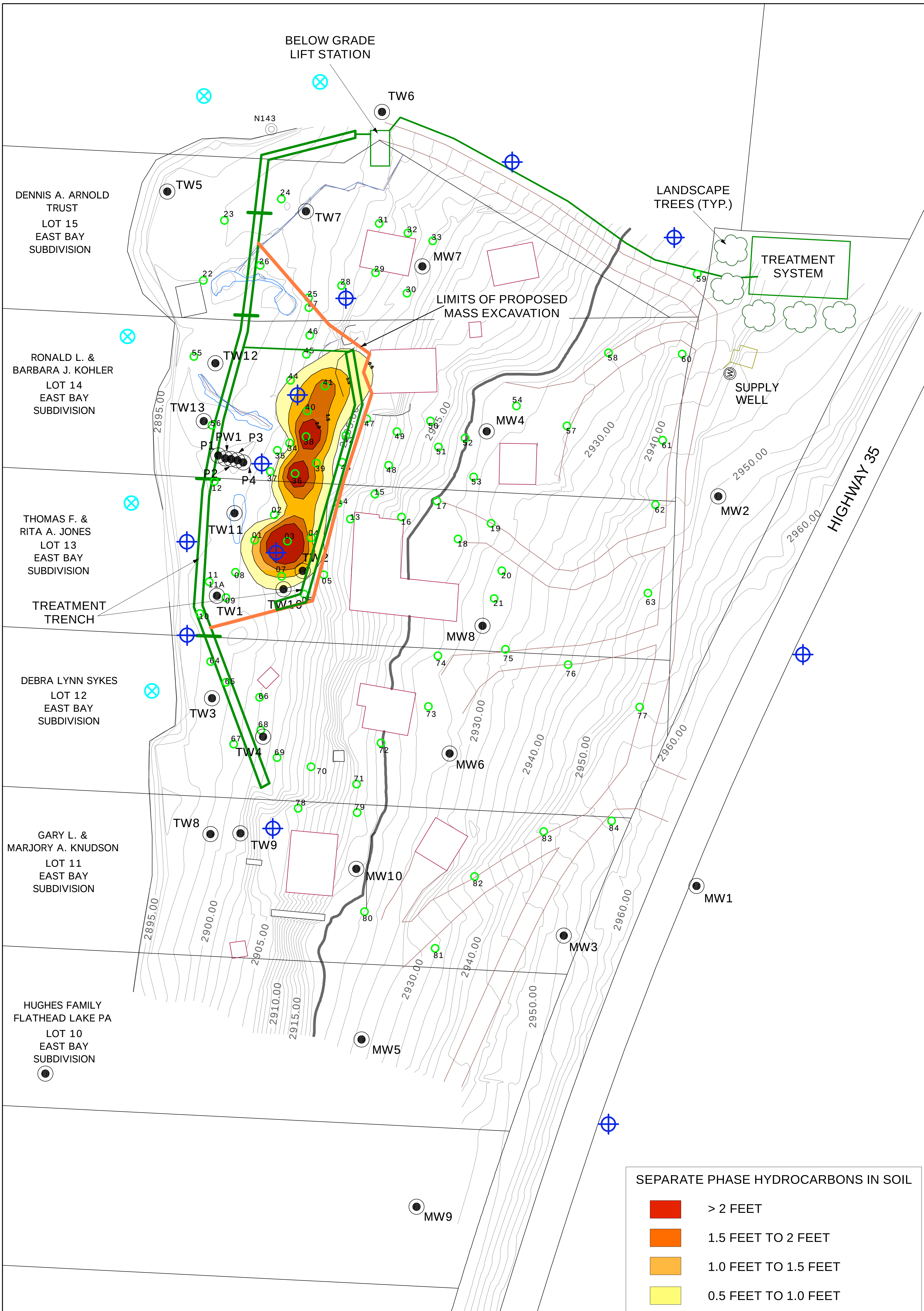
FIGURE 8

DISTRIBUTION OF BENZENE IN SHALLOW GROUND WATER, JUNE 7 THROUGH JUNE 9, 2008

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

SCALE: 1" = 60'

- MONITORING WELL LOCATION
- LIF BORING LOCATION
- PROPOSED MONITORING WELL LOCATION
- PROPOSED SURFACE WATER SAMPLING LOCATION
- LIMITS OF PROPOSED MASS EXCAVATION

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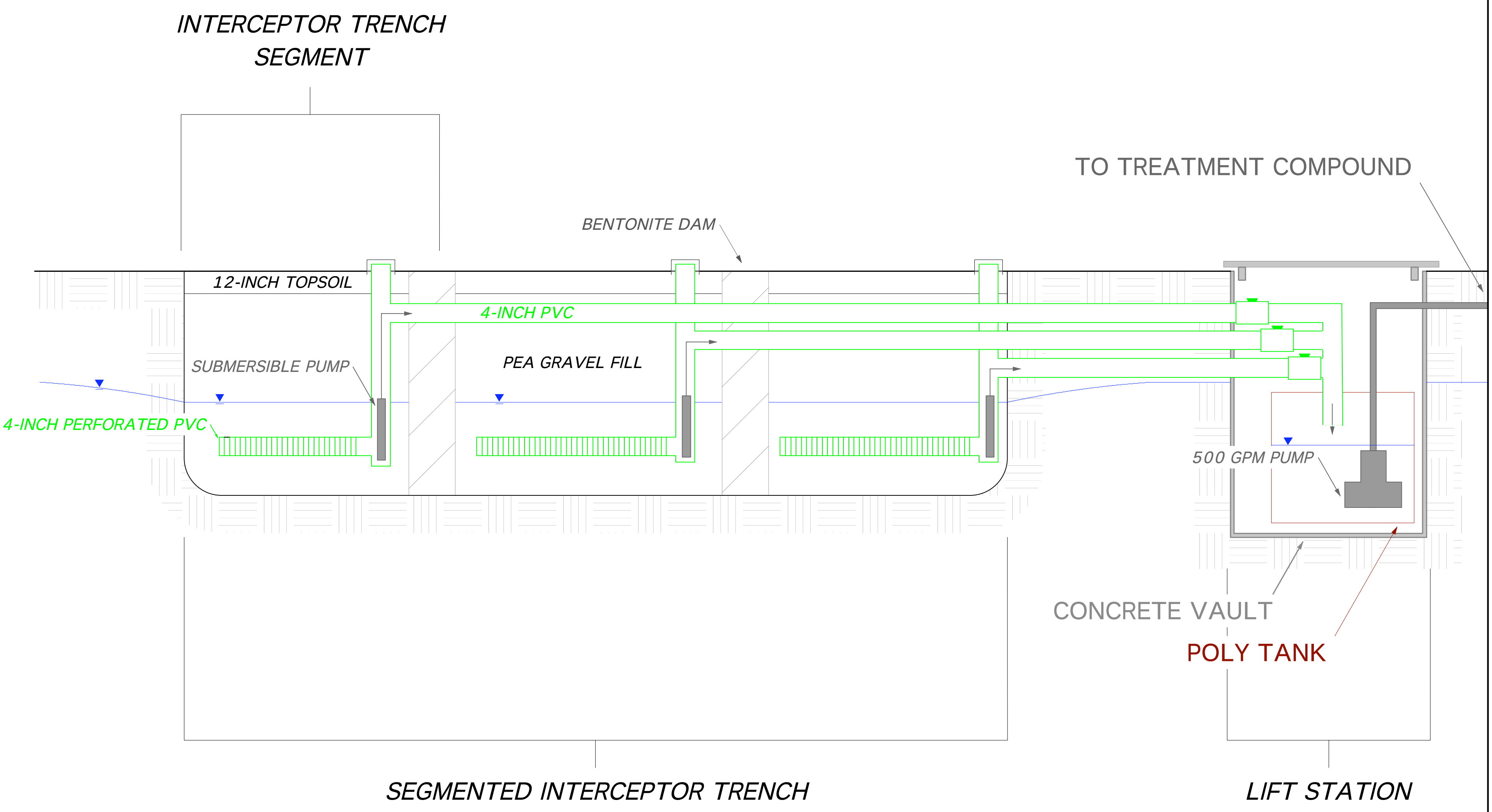
Issaquah, Washington 98027

FIGURE 9

PROPOSED INTERIM ACTIONS AND PROPOSED ADDITIONAL SAMPLING LOCATIONS

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	ARM	EMK	06/25/08



KEY:

NOT TO SCALE

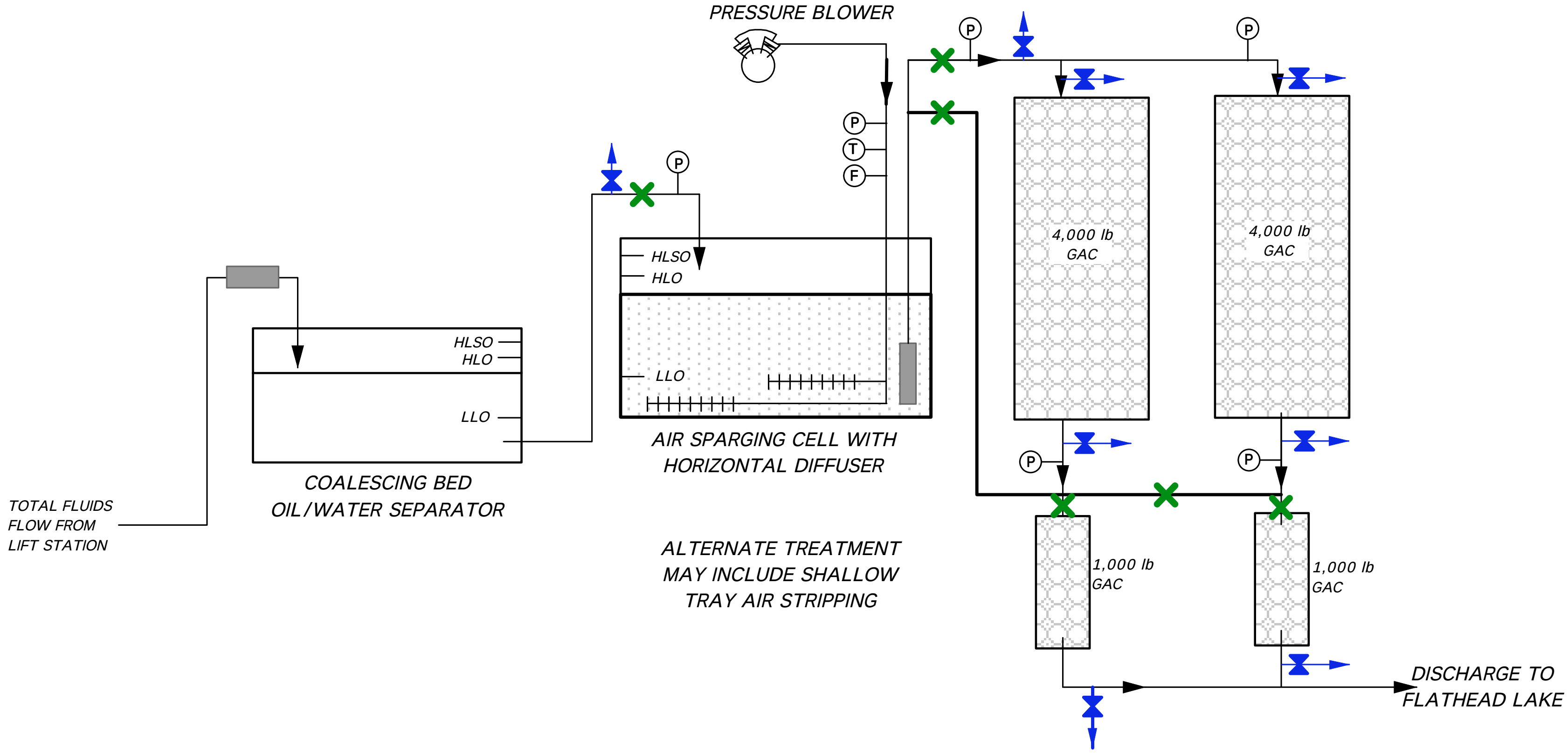
ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 10

DETAIL OF TYPICAL TREATMENT TRENCH

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	EMK	TCM	06/26/08



KEY:

HLSO = HIGH LEVEL SHUT OFF — SHUT OFF VALVE — (P) PRESSURE GAGE

HLO = HIGH LEVEL OFF — SAMPLE PORT — (T) TEMPERATURE GAGE

LLO = LOW LEVEL ON — FLOW METER — (F) FLOW SAMPLING PORT

NOTE: TREATMENT DEPENDENT ON FLOW AND CONCENTRATION

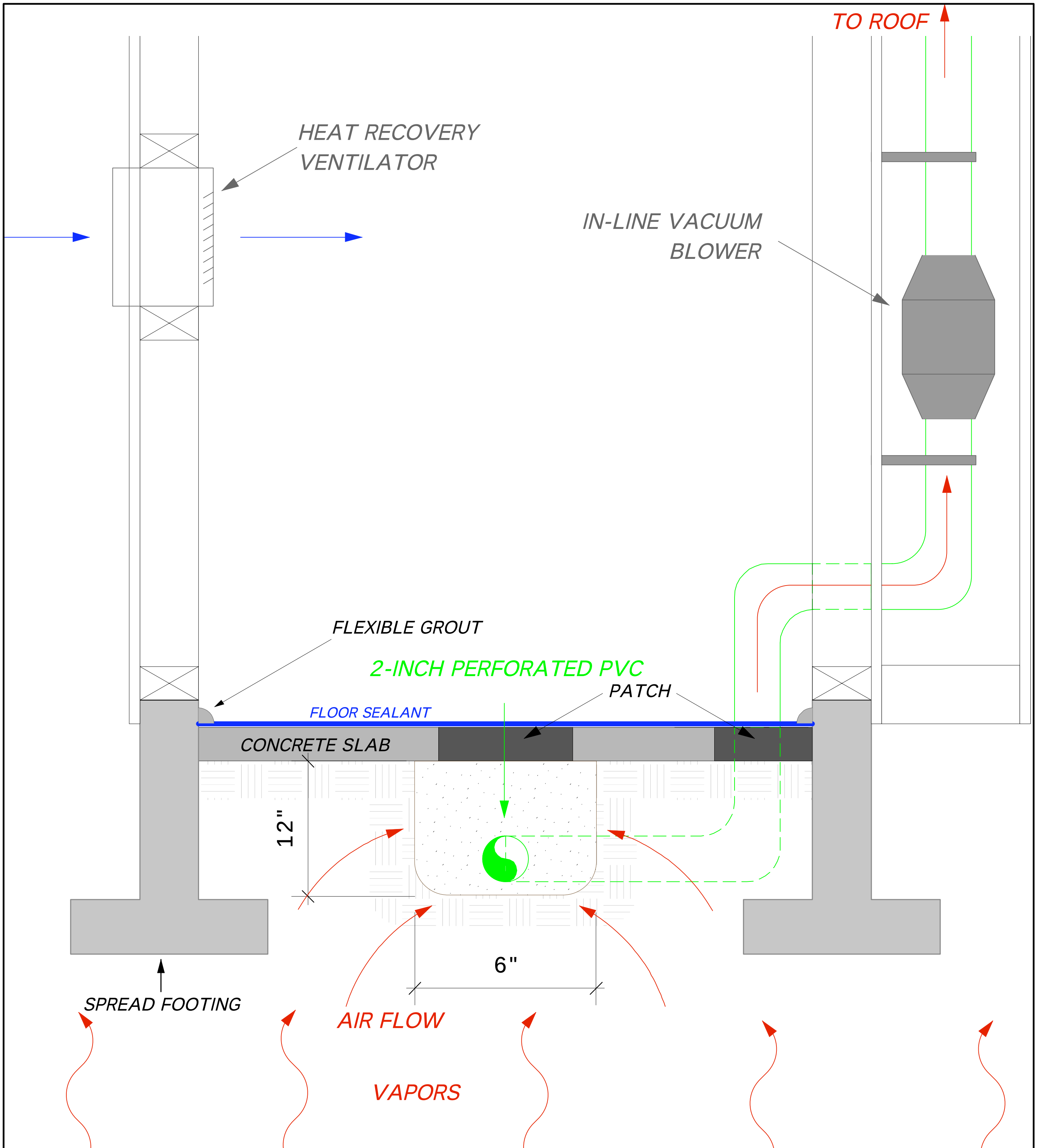
ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 11

WATER TREATMENT SYSTEM
CONCEPTUAL DESIGN

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	TCM	06/26/08



KEY:

NOT TO SCALE

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 12

TYPICAL VAPOR MITIGATION SYSTEM

PROJECT	56401.1
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP
LOCATION	HIGHWAY 35 POLSON, MONTANA

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	EMK	TCM	06/26/08

Attachment A

From: "Thomas C. Morin, L.G." <thomm@epi-wa.com>
Subject: **East Bay Homeowners Association; Status Update No. 1 - Keller Transport Fuel Spill**
Date: May 29, 2008 2:27:59 PM PDT
To: Arnold <justonearnold@msn.com>, David McCarthy <davidtmarmonte@aol.com>, Debra Sykes <debrasykes@mac.com>, Gary Knudsen <gknudson@qwestoffice.net>, Ron and Barb Kohler <hellroarin@montana.com>, Warren <ptibbitts123@yahoo.com>, Robert Cunningham <recunningham@centurytel.net>, Richard Wallace <wallace@littleappletech.com>, Jim Gates <jimgat406@aol.com>, Laurel Anderson-Restami <landersonr@aol.com>, Greg and Tracie Bauer <go2sleep1@verizon.net>, Mike Ferguson <mike@timberwolfvillas.com>, Harold Hughes <glacierredangus@yahoo.com>, Mark Rothwell <jmrothwell@bresnan.net>, Debbie Ofstad <dofstad@gmail.com>, Claudia Cunningham <practicalslayer@yahoo.com>, "A. James Ofstad" <ajofstad@gmail.com>
Cc: Mark S Yavinsky <Mark.Yavinsky@ace-ina.com>, "Laura J. Hawes" <lhawes@cozen.com>, Thomas Jones <TJones@cozen.com>, "Charles E. Hansberry" <cehansberry@GARLINGTON.COM>, Eric Koltes <erick@epi-wa.com>, Jim Rolle <jrolle@wcec.com>, Tom Elsemore <tome@epi-wa.com>, e-doc Log <e-doc@epi-wa.com>

Dear Homeowners,

My name is Thom Morin and I'm the Principal Geologist and majority owner of Environmental Partners, Inc. (EPI). I'd like to take this opportunity to introduce myself and our team and to give you an understanding of what will be occurring on your properties in the coming days.

As you know, the primary insurance coverage provided by Carolina Casualty for Keller Transport has been exhausted. Our team has been hired by the excess insurance carrier, Westchester, to continue the mitigation and remediation efforts on your properties.

During the initial response to the spill Cedar Creek Engineering has implemented several emergency response measures intended to protect the immediate threats posed to you and the environment. As we move forward, EPI's efforts will be to implement actions designed to continue to protect against immediate threats but to also implement more permanent solutions aimed at remediating and restoring your properties and reducing the impact of the remedial systems on your ability to use and enjoy your wonderful properties.

The first step in any efforts to remediate your properties is to develop a very solid understanding of where the fuel is, how it got there, and the extent of contamination to soil and ground water. In technical terms, this is called the Remedial Investigation (RI). The data generate by the RI will allow us to make educated recommendations and decisions on how to most effectively conduct the actual soil and ground water remediation. The efforts of Cedar Creek Engineering have been focused on addressing areas where the fuel seeps from the surface or enters ponds. That is fine in the short-term, however, our goal is to recover the fuel before it seeps out and to direct our efforts where they are most likely to be effective.

In the next few days our team will be conducting additional investigation intended to answer the question of where the fuel is located and how it has migrated. We will be using a methodology called Laser Induced Florescence (LIF) that identifies the presence of fuel in soil and ground water on a real-time basis. The device will be mounted on a skid-steer and uses hydraulic pressure to advance a probe into the subsurface. This will occur over about 3 to 4 days in virtually all accessible portions of the Arnold, Kohler, Jones, Sykes, and Knudsen properties.

The second step in our efforts will be to conduct additional indoor air sampling and inspection of the Arnold, Kohler, Jones, Sykes, and Knudsen residences and to propose specific and detailed solutions to the indoor air issues. I will be contacting those homeowners separately with specific information.

The third step in our efforts will be to make the existing water treatment system quieter and more effective. Our long term goal for this system is to upgrade its effectiveness and to find a more permanent location that has less visual impact and which can survive a Montana winter. We also need to make sure that we are in compliance with applicable regulations and have appropriate permits.

I will be the technical lead on this project. I have 20 years of environmental consulting experience and both my company and I have a broad range of experience and capabilities. You can view our website at www.epi-wa.com. I am a "hands on" project manager and will be involved in all facets of your project. EPI's project manager for your project will be Mr. Eric Koltes. Eric has worked for me for 11 years and is an exceptional consultant and environmental geologist. EPI will have local support from West Central Environmental Consultants (WCEC). I have worked with WCEC in the past and their Regional Manager, Mr. Jim Rolle. Jim is also a very experienced and exceptional geologist. Jim and his folks are out of Missoula and will be doing much of the day-to-day onsite work. Jim and WCEC are very professional and highly capable. Jim and I have worked together on another project that shared many characteristics with your properties.

If you have questions or concerns about the pending or ongoing actions at your properties I encourage you to contact me directly either at my desk (425.395.0030) or on my cell (206.954.6957). If you can't reach me please call Eric (425.395.0014, 425.922.5666) or Jim (406.360.3797).

Sincerely,
Thom Morin

From: "Thomas C. Morin, L.G." <thomm@epi-wa.com>
Subject: **East Bay Homeowners Association; Status Update No. 2 - Keller Transport Fuel Spill**
Date: June 6, 2008 3:53:34 PM PDT
To: "A. James Ofstad" <ajofstad@gmail.com>, Arnold <justonearnold@msn.com>, David McCarthy <davidtmarmonte@aol.com>, Gary Knudsen <gknudson@qwestoffice.net>, Robert Cunningham <recunningham@centurytel.net>, Ron and Barb Kohler <hellroarin@montana.com>, Warren <ptibbitts123@yahoo.com>, Richard Wallace <wallace@littleappletech.com>, Jim Gates <jimgat406@aol.com>, Laurel Anderson-Restami <landersonr@aol.com>, Mike Ferguson <mike@timberwolfvillas.com>, Greg and Tracie Bauer <go2sleep1@verizon.net>, Harold Hughes <glacierredangus@yahoo.com>, Mark Rothwell <jmrothwell@bresnan.net>, Debbie Ofstad <dofstad@gmail.com>, Claudia Cunningham <practicalslayer@yahoo.com>, Debra Sykes <debrasykes@mac.com>
Cc: "Laura J. Hawes" <lhawes@cozen.com>, Thomas Jones <TJones@cozen.com>, "Charles E. Hansberry" <cehansberry@GARLINGTON.COM>, rsullivan@mcgarveylaw.com, tim@bechtoldlaw.net, Jim Rolle <jrolle@wcec.com>, Eric Koltes <erick@epi-wa.com>, e-doc Log <e-doc@epi-wa.com>

Dear Homeowners,

This email presents our Status Update No. 2 for the Keller Transport Fuel Spill. In the last week we have been very busy on the properties.

The following tasks have been completed or are nearing completion:

1. Field investigation for the presence and distribution of fuel in soil. This used the LIF technology discussed previously and was intended to identify areas of fuel in soil, the thickness of the soil column, and the depth to bedrock. We looked in over 80 locations and have quite a bit of data to digest over the next week or so. The purpose of these data are to help us identify the locations and methods that are most appropriate for optimizing a) the removal of fuel from the subsurface and b) protection of the lake and shoreline.

2. Resampling all wells and discharge points. This was needed so that we could have a reliable and contemporaneous data set and to assess not only the limits of the fuel, but also the limits of fuel components dissolved in ground water. These "dissolved-phase" impacts are just as important for cleanup and site restoration as the free- phase fuel and help us to assess ground water flow directions and paths.

3. Resampling of air in several of the residences so that we can establish current conditions using a methodology recognized by the regulatory agencies. This involves the use of a Summa Cannister which actively collects air samples over a 24-hour period. This sampling is considered by the agencies and scientists to provide a fully quantifiable result which can be relied upon for health risk and human exposure calculations. This sampling also provides a much lower detection limit than the sampling that was previously employed.

4. Contact with the regulatory agencies. We have been in discussions with EPA, Lake County OEM, and the Tribe regarding our current and planned actions. There are a couple of documents that are due to EPA over the next few days and we will be asking for short extensions to those deadlines. The reason for this is that the field work that is currently being performed is providing good data that will allow us to,

for example, better plan and represent what we will do in the Work Plan. We don't want to present a plan to EPA which once we get our current data in and reviewed, becomes instantly obsolete. From EPI's perspective, we want to do this work quickly, but we also want to do it intelligently.

Additional Considerations

As we move forward with the site work one of the things we need to keep in mind is that we need to get a more permanent treatment system(s) designed, installed, and fully operational before winter sets in. That gives us a fairly tight window to do a lot of work. As you all have probably realized, the current treatment system will not survive a Montana winter. With that in mind, we will be trying to do some things on a relatively fast track. This applies particularly to the design and installation of the treatment system but also to the systems to treat the dissolved-phase compounds and to control vapor migration.

Our goal remains to fully characterize the extent of contamination and to then implement remedial systems that will both restore the environment and be fully protective of human health.

As before, if you have any questions please do not hesitate to contact me.

Thom Morin
425.395.0030 (direct)
206.954.6957 (cell)

From: "Thomas C. Morin, L.G." <thomm@epi-wa.com>
Subject: **Re: East Bay Homeowners Association; Status Update No. 3 - Keller Transport Fuel Spill**
Date: June 13, 2008 12:35:03 PM PDT
To: Arnold <justonearnold@msn.com>, "A. James Ofstad" <ajofstad@gmail.com>, Debra Sykes <debrasykes@mac.com>, Gary Knudsen <gknudson@qwestoffice.net>, Robert Cunningham <recunningham@centurytel.net>, Warren <ptibbitts123@yahoo.com>, Ron and Barb Kohler <hellroarin@montana.com>, Richard Wallace <wallace@littleappletech.com>, Jim Gates <jimgat406@aol.com>, Laurel Anderson-Restami <landersonr@aol.com>, Mike Ferguson <mike@timberwolfvillas.com>, Greg and Tracie Bauer <go2sleep1@verizon.net>, Harold Hughes <glacierredangus@yahoo.com>, Debbie Ofstad <dofstad@gmail.com>, Mark Rothwell <jmrothwell@bresnan.net>, Claudia Cunningham <practicalslayer@yahoo.com>, David McCarthy <davidtmarmonte@aol.com>
Cc: Mark S Yavinsky <Mark.Yavinsky@ace-ina.com>, "Laura J. Hawes" <lhawes@cozen.com>, Thomas Jones <TJones@cozen.com>, "Charles E. Hansberry" <cehansberry@GARLINGTON.COM>, Roger Sullivan Work <rsullivan@mcgarveylaw.com>, lakeoem@lakemt.gov, Timothy Bechtold <tim@bechtoldlaw.net>, Jim Rolle <jrolle@wcec.com>, Eric Koltes <erick@epi-wa.com>, e-doc Log <e-doc@epi-wa.com>, inman.donnak@epa.gov, Mike Durglo <miked@cskt.org>

Dear Homeowners,

This email presents our Status Update No. 3 for the Keller Transport Fuel Spill.

The following tasks have been completed in the previous week:

1. We received data that indicated a seep on the Arnold property contained concentrations exceeding the allowable limits. We met with representatives of the Tribe on-site and developed a plan for capturing and treating that seep as well as a plan for collecting samples to assess exposure to the lake. Appropriate actions are underway.

2. We have had telephone discussions with EPA to go over the site status and how to move forward. EPI indicated to EPA that we would be seeking an extension to the deadline for a Work Plan on the basis that additional site investigation data are needed before making a reasoned and informed decision on how to proceed with additional cleanup actions. We indicated that we were in the process of completing the additional investigation and hoped to be receiving laboratory analytical data fairly soon. EPI will be sending the formal written request for extension to EPA today or Monday.

3. EPA indicated that the previously filed permit application for discharge to the lake (i.e., NPDES Permit) was deficient and that EPA would be requesting additional information and/or changes to that application. We are awaiting EPA's formal response to that application.

4. Indoor air sampling was completed at a number of the homes and we received those data late yesterday. We will be reviewing those data to assess what they may mean and contacting the individual homeowners regarding those data.

5. We are continuing to upgrade the temporary treatment system to make it more effective and cheaper to operate.

6. Ongoing sampling and analysis of the water supply well. Samples of the water directly from the water supply well where it discharges into your storage cistern are collected on a daily basis. These samples have remained "Non-Detect" for all laboratory analytes. The detection limits for those compounds are well below the regulatory limits. Therefore, the water at your taps remains safe for consumption and any other use. We will continue daily sampling for a period of time until we establish a data set that indicates there are not short-term up-ticks in concentrations. If that can be established we will reduce the sampling frequency to twice per week in an attempt to control project costs.

It is EPI's understanding that there is a homeowner's meeting scheduled for June 21, 2008. EPI would like to respectfully request that the meeting be postponed until July 26 and that EPI and members of our team be allowed to attend. At that time we will be prepared to present to the homeowners group our findings to date, our planned actions, to discuss where the longer-term treatment system could be located and a few other items that may come up between now and then. I would submit to you all an agenda of items for discussion that would serve as the starting point and we could go from there. EPI has been in contact with Mr. Kohler to initially present this idea.

As before, if you have any questions please do not hesitate to contact me.

Thom Morin
425.395.0030 (direct)
206.954.6957 (cell)

On Jun 6, 2008, at 3:53 PM, Thomas C. Morin, L.G. wrote:

> Dear Homeowners,
>
> This email presents our Status Update No. 2 for the Keller Transport Fuel Spill. In the last week we have been very busy on the properties.
>
> The following tasks have been completed or are nearing completion:
>
> 1. Field investigation for the presence and distribution of fuel in soil. This used the LIF technology discussed previously and was intended to identify areas of fuel in soil, the thickness of the soil column, and the depth to bedrock. We looked in over 80 locations and have quite a bit of data to digest over the next week or so. The purpose of these data are to help us identify the locations and methods that are most appropriate for optimizing a) the removal of fuel from the subsurface and b) protection of the lake and shoreline.
>
> 2. Resampling all wells and discharge points. This was needed so that we could have a reliable and contemporaneous data set and to assess not only the limits of the fuel, but also the limits of fuel components dissolved in ground water. These "dissolved-phase" impacts are just as important for cleanup and site restoration as the free- phase fuel and help us to assess ground water flow directions and paths.
>
> 3. Resampling of air in several of the residences so that we can establish current conditions using a methodology recognized by the regulatory agencies. This involves the use of a Summa Cannister which actively collects air samples over a 24-hour period. This sampling is considered by the agencies and scientists to provide a fully quantifiable result which can be relied upon for health risk and human exposure calculations. This sampling also provides a much lower detection limit than the sampling that was previously employed.
>
> 4. Contact with the regulatory agencies. We have been in discussions with EPA, Lake County OEM, and the Tribe regarding our current and planned actions. There are a couple of documents that are due to EPA over the next few days and we will be asking for short extensions to those deadlines. The reason for this is that the field work that is currently being performed is providing good data that will allow us to, for example, better plan and represent what we will do in the Work Plan. We don't want to present a plan to EPA which once we get our current data in and reviewed, becomes instantly obsolete. From EPI's perspective, we want to do this work quickly, but we also want to do it

intelligently.

Additional Considerations

As we move forward with the site work one of the things we need to keep in mind is that we need to get a more permanent treatment system(s) designed, installed, and fully operational before winter sets in. That gives us a fairly tight window to do a lot of work. As you all have probably realized, the current treatment system will not survive a Montana winter. With that in mind, we will be trying to do some things on a relatively fast track. This applies particularly to the design and installation of the treatment system but also to the systems to treat the dissolved-phase compounds and to control vapor migration.

Our goal remains to fully characterize the extent of contamination and to then implement remedial systems that will both restore the environment and be fully protective of human health.

As before, if you have any questions please do not hesitate to contact me.

Thom Morin
425.395.0030 (direct)
206.954.6957 (cell)

From: "Thomas C. Morin, L.G." <thomm@epi-wa.com>
Subject: **Re: East Bay Homeowners Association; Status Update No. 4 - Keller Transport Fuel Spill**
Date: June 20, 2008 12:26:55 PM PDT
To: Arnold <justonearnold@msn.com>, "A. James Ofstad" <ajofstad@gmail.com>, Debra Sykes <debrasykes@mac.com>, Gary Knudsen <gknudson@qwestoffice.net>, Robert Cunningham <recunningham@centurytel.net>, Warren <ptibbitts123@yahoo.com>, Ron and Barb Kohler <hellroarin@montana.com>, Richard Wallace <wallace@littleappletech.com>, Jim Gates <jimgat406@aol.com>, Laurel Anderson-Restami <landersonr@aol.com>, Mike Ferguson <mike@timberwolfvillas.com>, Greg and Tracie Bauer <go2sleep1@verizon.net>, Harold Hughes <glacierredangus@yahoo.com>, Debbie Ofstad <dofstad@gmail.com>, Mark Rothwell <jmrothwell@bresnan.net>, Claudia Cunningham <practicalslayer@yahoo.com>, David McCarthy <davidtmarmonte@aol.com>, Mark Yavinsky <Mark.Yavinsky@ace-ina.com>, "Laura J. Hawes" <lhawes@cozen.com>, Thomas Jones <TJones@cozen.com>, "Charles E. Hansberry" <cehansberry@GARLINGTON.COM>, Roger Sullivan Work <rsullivan@mcgarveylaw.com>, lakeoem@lakemt.gov, Timothy Bechtold <tim@bechtoldlaw.net>, Jim Rolle <jrolle@wcec.com>, Eric Koltes <erick@epi-wa.com>, e-doc Log <e-doc@epi-wa.com>, Donna Inman <inman.donnak@epa.gov>, Mike Durglo <miked@cskt.org>, rbrosten@centurytel.net

Dear Homeowners,

This email presents our Status Update No. 4 for the Keller Transport Fuel Spill

The following tasks have been performed in the previous week:

1. The seep on the Arnold property has been captured and is being routed to the treatment system.

2. We have provided EPA with a letter requesting an extension to the deadline for the Work Plan submittal. We received an extension until June 26, which was not exactly what we had hoped for but will have to suffice.

3. We have not yet heard back from EPA regarding the NPDES permit or any required modifications. We continue to operate the system and to demonstrate compliance with the most likely discharge criteria so our actions remain protective of the environment and the substantial requirements of the permit, even though the permit has not yet been finalized.

4. We have reviewed and compiled the indoor air data and will be providing those data to the individual property owners under separate cover.

5. Ongoing sampling and analysis of the supply well continues to confirm that the water is not impacted with detectable concentrations of gasoline compounds. All detection limits for the various compounds are well below the regulatory limits.

6. We are about half of the way through our analysis of the additional site investigation data that was completed a couple of weeks back. These data are very encouraging and they indicated that we now have a very strong understanding of where the separate-phase fuel is located, how it got there and how we can capture it. We also have a strong understanding of where the dissolved-phase gasoline is located but there are some gaps that we'll need to fill.

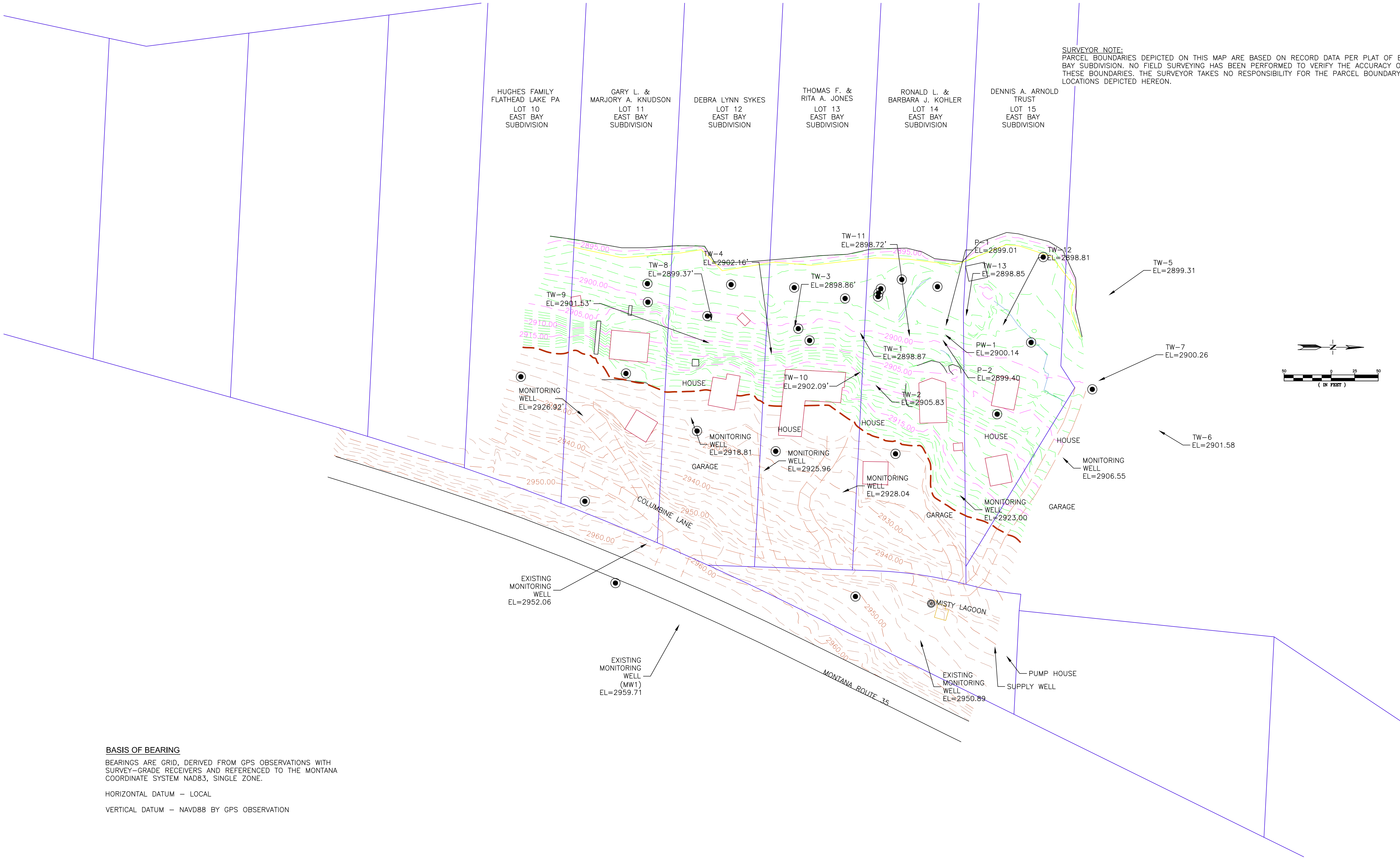
We continue to perform the necessary monitoring and sampling of the treatment system and the water supply well.

In the next week we'll be working on our analysis of the data and preparing the Draft Work Plan for submittal to EPA. The good news on the timing of the extension is that we will likely have EPA's comments on the Draft Work Plan back before the Homeowners meeting in July and we'll all be able to speak in more detail about the next steps. During the homeowners meeting our team will be presenting a fairly detailed presentation of our findings and plans and will need some feedback from you all.

As always, please do not hesitate to contact me if you have questions or comments.

Thom Morin
425.395.0030 (direct)
206.954.6957 (cell)

Attachment B



SURVEYOR NOTE:
PARCEL BOUNDARIES DEPICTED ON THIS MAP ARE BASED ON RECORD DATA PER PLAT OF EAST BAY SUBDIVISION. NO FIELD SURVEYING HAS BEEN PERFORMED TO VERIFY THE ACCURACY OF THESE BOUNDARIES. THE SURVEYOR TAKES NO RESPONSIBILITY FOR THE PARCEL BOUNDARY LOCATIONS DEPICTED HEREON.

BASIS OF BEARING

BEARINGS ARE GRID, DERIVED FROM GPS OBSERVATIONS WITH SURVEY-GRADE RECEIVERS AND REFERENCED TO THE MONTANA COORDINATE SYSTEM NAD83, SINGLE ZONE.

HORIZONTAL DATUM – LOCAL

VERTICAL DATUM – NAVD88 BY GPS OBSERVATION

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	DATE	BY

X:\CLIENTS\ACTIVE PROJECTS\ACE (COZEN) 564\56401.1 REMEDIATION SERVICES\DRAFTING\SITE SURVEY_052208.DWG PLOTTED BY:ENVIRONMENTAL PARTNERS ON Jun/26/2008

MORRISON MAIERLE, INC.
An Employee-Owned Company
Engineers
Surveyors
Scientists
Planners
3011 Palmer Street,
Missoula, MT 59808
Phone: (406) 542-8880
Fax: (406) 542-4801

DRAWN BY: CAD
CHK'D. BY: SRS
APPR. BY: SRS
DATE: 05-113-08
Q.A. REVIEW
BY:
DATE:

LAKE COUNTY HIGHWAY 35 MONTANA

SITE SURVEY - MONITERING WELLS

PROJECT NUMBER 4428.001
SHEET NUMBER 1
DRAWING NUMBER 1

Attachment C

Attachment C:
DRAFT Quality Assurance Project Plan for Keller Trucking Fuel Truck Spill

Montana Route 35, Mile Marker 5.2
Polson, Montana

Prepared For:

ACE Westchester Specialty Group
c/o Cozen O'Connor
12013rd Avenue, Suite 5200
Seattle, WA 98101

June 30, 2008

Prepared By:

Environmental Partners, Inc.
295 NE Gilman Blvd., Suite 201
Issaquah, Washington 98027
(425) 395-0010

Project Number: 56401.1

QR____ TR____

DISTRIBUTION LIST

This Quality Assurance Project Plan (QAPP) distribution list identifies all individuals who should receive a copy of the approved QAPP, either in hard copy or electronic form. Individuals on this distribution list should also receive any subsequent revisions to this QAPP.

- Mr. Mark Yavinsky
  ACE Westchester Specialty Group
  c/o Ms. Laura Hawes
  Cozen O'Connor
  1201 3rd Avenue, Suite 5200
  Seattle, WA 98101
  (206) 340-1000 (office)
  (206) 621-8783 (fax)

- Mr. John Wardell/ US EPA Region 8, Project Manager
  EPA Montana Operations Office
  Federal Building
  10 West 15th Street, Suite 3200
  Helena, MT 59626
  (406) 457-5000

- Mr. Thom Morin/ EPI Project Manager
  Environmental Partners, Inc.
  295 NE Gilman Blvd., Suite 201
  Issaquah, WA 98027
  (425) 395-0010 (office)
  (425) 395-0011 (fax)

- Mr. Eric Koltes/ EPI Assistant Project Manager, Quality Control Officer
  Environmental Partners, Inc.
  295 NE Gilman Blvd., Suite 201
  Issaquah, WA 98027
  (425) 395-0010 (office)
  (425) 395-0011 (fax)

- Mr. Jim Rolle/ WCEC Field Team Leader, Site Health and Safety Officer
  West Central Environmental Consultants
  10930 South Avenue West
  Missoula, MT 59801
  (406) 549-8487 (office)
  (406) 549-8490 (fax)

- Mr. Jon Hager / Energy Laboratories, Inc., Project Manager
- Ms. Amanda Blackburn/ Energy Laboratories, Inc., QA Manager
  3161 East Lyndale Avenue
  Helena, MT 59604
  (406) 442-0711 (office)
  (406) 442-0712 (fax)

TABLE OF CONTENTS

TABLES

FIGURE

ACRONYMS

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CLP	Contract Laboratory Program
COC	contaminant of concern
DQO	Data Quality Objective
DP	direct-push
EPA	United States Environmental Protection Agency
EPI	Environmental Partners, Incorporated
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCl	hydrochloric acid
HDPE	high-density polyethylene
LCS	laboratory control samples
MA-VPH	Massachusetts Volatile Petroleum Hydrocarbons Method
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
MRL	method reporting limit
µg/L	micrograms per liter
mg/L	milligrams per liter
NWTPH-Gx	Northwest Total Petroleum Hydrocarbons – gasoline range
OSHA	Occupational Safety and Health Administration
%R	percent recovery
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SM	Standard Methods for Examination of Water and Wastewater
SOP	standard operating procedure
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
WCEC	West Central Environmental Consultants
WP	Work Plan
YSI	Yellow Springs Instrument, Inc.

1.0 PROJECT DESCRIPTION

This document presents the quality assurance procedures that will be followed during the investigation and remediation work activities at the Keller Trucking Fuel Truck Spill site.

1.1 Introduction

This Quality Assurance Project Plan (QAPP) is Attachment B of the Work Plan (WP) for the investigation and remediation of total petroleum hydrocarbons – gasoline range. The Work Plan was prepared by Environmental Partners, Inc. (EPI). The QAPP does the following:

- Describes the organization, objectives, planned activities, and quality assurance/quality control (QA/QC) procedures associated with Work Plan.
- Presents analytical methods and associated QA/QC procedures selected to meet Data Quality Objectives (DQOs).
- Discusses specific protocols for environmental sampling, sample handling and storage, chain of custody, analytical DQOs, field and laboratory analytical procedures, and data quality evaluation criteria.

The QAPP is used in conjunction with the Sampling and Analysis Plan (SAP; see Attachment A). The SAP provides a detailed description of work associated with field activities (e.g., sample types, sample locations, and so on) and specifies the protocols for collecting samples and other field operations that are specific to the investigation and remediation for the fuel spill site. A project-specific Health and Safety Plan (HASP) is included as Attachment C.

The WP, SAP, QAPP, and HASP have been prepared by order of the United States Environmental Protection Agency (EPA) Region 8 under the authority of Section 3008(h) of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended (42 USC 6928[h]).

1.2 Background

Information in this section, including the site description, facility history, and background, is summarized from the Work Plan.

On April 2, 2008, a single-vehicle accident involving a fuel tanker truck released approximately 6,000 gallons of gasoline along Montana Highway 35 at mile marker 5.2 northeast of Polson, Montana. An emergency response team from EPA Region 8 coordinated the immediate response to the spill.

Petroleum-contaminated soil was excavated and ground water monitoring wells were installed as part of the initial response work. Monitoring was performed in existing and new wells near the spill area and in seeps along the shore of nearby Flathead Lake. Preliminary remedial measures for ground water interception and treatment have been taken. A number of residences near the contaminated ground water area have been temporarily abandoned due to infiltration of volatile organic compounds (VOCs) into indoor air spaces.

Soil and ground water petroleum hydrocarbon contamination remain at the work site. The project has transitioned from an emergency response action to a longer-term investigation and remediation effort of residual contamination. The investigation work will locate residual contamination and identify migration pathways. The remediation work will seek to protect human health and the environment by removing or destroying residual contamination in soil and ground water. This will be accomplished by incremental improvements to the trench interceptor collection and treatment of ground water and possible implementation of new remedial technologies. Remediation efforts will also include implementation of vapor mitigation work to restore affected residences to a livable condition.

1.3 Project Objectives

1.3.1 Specific Objectives and Associated Tasks

Sampling and analysis procedures are designed to be sufficient to satisfy the project objectives identified in the Work Plan, which are listed below:

- Acquire soil, ground water, and seep water data to provide an understanding of the location of petroleum contamination. This work will require application of direct-push technology and installation of new wells to collect additional soil and ground water data. The data will be used to develop a conceptual model of contamination and migration pathways at the site. Indoor air data will also be collected from the affected residences to quantify impacts to the residences.

- Utilize the data to support and improve the current ground water collection and treatment system and to implement new systems, as necessary, to expedite the total cleanup. Implement systems to reduce or eliminate the impact to indoor air in residences.

- Do no harm to the environment.

This QAPP presents the field procedures, sampling and analytical methods, and associated QA/QC procedures selected to meet the required DQOs.

1.3.1.1 Work Plan Schedule

Work Plan events will commence within 15 days of EPA approval of the final Work Plan.

1.3.1.2 Sampling Schedule

The proposed sampling schedule is presented in the SAP.

1.3.2 Project Target Parameters and Analytical Methods

Project target parameters for ground water monitoring are:

- Gasoline-range volatile petroleum hydrocarbons by Methods MA-VPH and NWTPH-Gx.
- Drinking water VOCs by EPA Method E524.2.
- Volatile indoor air compounds by Method MA-VPH.
- Geochemical indicator parameters (field measured).

Gasoline contaminant compounds in soil and water will be quantified by Methods MA-VPH, NWTPH-Gx, and EPA E524.2. Indoor air samples will be analyzed by Method MA-VPH. Geochemical parameter measurement of ground water will determine if well purging is complete to ensure that representative ground water samples are collected.

1.3.3 Data Quality Objectives

Data must be of sufficient quality to meet the DQOs noted above. Two levels of data quality and analysis are applicable for this project:

- Screening level data.
- Definitive data.

1.3.3.1 Screening Level Data

Field measurements are performed using portable instruments. Field measurement results are used to evaluate ground water geochemical conditions. Field measurement methods are summarized in Section 4 of the QAPP.

1.3.3.2 Definitive Data

Fixed laboratory data meets a higher level of stringency and is used to monitor soil, ground water, and indoor air samples. Analytical procedures are discussed in Section 7 of this plan. To generate data of sufficient quality, the following approach for analytical laboratory data for ground water samples is followed:

- The laboratory is accredited by the EPA and State of Montana.
- Applicable analytical test methods (e.g., EPA SW-846 methods and State of Montana) will be used.
- QC samples and procedures are used by the laboratory for analysis.
- Data summary packages generated and documentation provided are sufficient to perform a Level II data quality review.
- Data quality review will be performed on the analytical data according to the procedures specified in Section 9.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

EPI has overall responsibility for execution of the Work Plan. Project management, quality assurance, laboratory, and field responsibilities of essential project personnel are defined below.

2.1 Project Organization Chart

Main contact names and addresses are show in the Distribution List. The project management organization is depicted in Figure 1.

2.2 Management, Quality Assurance, Field, and Laboratory Responsibilities

Mr. John Wardell is the EPA Project Manager. Mr. Thom Morin is EPI's Project Manager and Mr. Eric Koltes is his assistant. Mr. Jim Rolle of West Central Environmental Consultants (WCEC) is the Field Team Leader and is responsible for day-to-day field implementation.

Energy Laboratories, Incorporated (ELI) of Helena, Montana has been selected to perform laboratory analysis. Mr. Jon Hager is ELI's Project Manager for this project. Ms. Amanda Blackburn is ELI's laboratory quality assurance officer.

The project organizational structure is presented in Figure 1. The following paragraphs describe individual responsibilities for key team members.

The EPI Project Manager, Mr. Thom Morin, is responsible for overseeing project performance to ensure contract compliance and for implementing all necessary actions and adjustments to accomplish program objectives. The team lead also acts as liaison with agencies, the client, the laboratory, and contract personnel.

The Project QA Officer is Mr. Eric Koltes of EPI. He is responsible for overall implementation of the QAPP. Duties include overseeing all contractor activities to ensure compliance with the QAPP, including field and laboratory activities, and project work products. The QA Officer will work closely with the other QA Managers, be immediately notified if problems occur, and approve changes to the Work Plan if such changes are warranted.

Mr. Jim Rolle of WCEC is the Field Team Leader and is responsible for day-to-day coordination of field work, coordinating and managing field staff and subcontractors, implementing QC procedures for field measurements, and for monitoring and documenting all work performed.

The Laboratory Project Manager, Mr. Jon Hager of ELI, will serve as the primary laboratory contact and will be responsible for sample tracking and analysis at the analytical laboratory. The Laboratory QA Officer is Ms. Amanda Blackburn, who is responsible for monitoring and documenting the quality of all work produced by the laboratory for this project, and for implementing corrective action should the need arise.

2.3 Special Training Requirements and Certifications

No special training or certification is required other than all field personnel will be trained as required by the Occupational Safety and Health Administration's Hazardous Waste Operations and Emergency Responses (OSHA-HAZWOPER) regulations.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The DQOs for the Work Plan are designed to ensure that the accuracy and precision of the data is sufficient and that the data are useful for project goals. QA and QC are important elements in all facets of a project. The complexity of environmental data and the need for comparability has led to requirements for QA and QC in the analytical laboratory without necessarily recognizing that QA and QC must be applied throughout the program. For example, poor sampling or sample handling practices can obviate the most careful laboratory analyses.

The data quality indicators presented in this section are precision, accuracy (bias), representativeness, comparability, completeness, and sensitivity. Table 1 summarizes the samples and procedures that will be analyzed or used to evaluate data quality. Table 2 summarizes the number of samples that will be analyzed to evaluate data quality. Project-specific control limits for these parameters are presented in Table 4.

3.1 Precision

Precision is a measure of the reproducibility of an analytical result (i.e., to obtain the same or similar results on replicate measurements of the same sample or of duplicate samples). Reproducibility is affected by matrix variations, the extraction procedure, and the analytical method used. For duplicate samples, precision is expressed as the relative percent difference (RPD). Precision will be evaluated for two components:

- Analytical method precision will be evaluated using matrix spike duplicates or laboratory duplicates, depending on the analytical method requirements.
- Analytical and field sampling precision will be evaluated using field duplicates.

The RPD (field or laboratory duplicates) will be reviewed during data quality review, deviations from the specified limits will be noted, and the effect on reported data commented upon by the data reviewer. Precision goals are presented in Table 3.

3.2 Accuracy

Accuracy is assessed by determining how close a measured value lies to its true value. Field accuracy is obtained through evaluation of trip blanks, proper sample handling, preservation, and compliance with holding times. Primary indicators of laboratory accuracy are obtained with blank, matrix spike, or laboratory control samples. A sample is spiked with an analyte of known concentration and is used to calculate the average percent recovery (%R). This sample can be a surrogate compound in organic methods, a blank, or a matrix spike. Accuracy goals are presented in Table 3.

Percent recoveries will be reviewed during data quality review, deviations from the specified limits will be noted, and the effect on reported data commented upon by the data reviewer.

3.3 Representativeness

Representativeness is a measure of how closely analytical results reflect the actual concentration or distribution of chemical compounds in a sampled media. The number, location, and frequency of samples influence representativeness; these factors are addressed in the Work Plan. Standard procedures for sample collection and handling have been developed to provide data that are representative of each sampling event. Field sampling procedures are discussed in detail in the SAP (Attachment A).

3.4 Comparability

Data comparability expresses the confidence with which each sampling event can be compared to another. Comparability will be maintained by use of consistent sampling procedures, approved analytical methods, consistent detection limits, and consistent units.

3.5 Completeness

Completeness for usable data is defined as the percentage of usable data out of the total amount of data generated. Specifically, the basis is the total number of scoped samples collected relative to the total number of valid results generated. When feasible, the amount of sample collected will be sufficient to reanalyze the sample should the initial results not meet QC requirements. Less than 100% completeness could result if sufficient chemical contamination exists to require sample dilutions, resulting in an increase in the project-required detection/quantitation limits for some parameters. Highly contaminated environments can also be sufficiently heterogeneous to prevent the achievement of specified precision and accuracy criteria. The target goal for completeness will be 90% for laboratory analytical methods as shown in Table 3.

3.6 Sensitivity

The sensitivity of the analytical methods (i.e., method reporting limits) identified for this project is sufficient to allow comparison of project results to decision criteria. Project decision criteria and analytical method quantitation limits for project COCs are listed in Table 3. Analytical method detection and reporting limits for all requested analytes are listed in Table 4. ELI periodically updates the method limits. Updated limits are to be reviewed to ensure that project DQOs are being met.

3.6.1 Method Detection Limit (MDL)

The MDL is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte (Appendix B of 40 CFR 136). MDL studies have been performed by the laboratory and are acceptable for this project. MDLs are listed in Table 4.

3.6.2 Method Reporting Limit (MRL)

The MRL is a lowest quantitative value, routinely reported, below which the laboratory reports a result of not detected. It may be based on project-specific concentrations of concern, regulatory action levels, or sensitivity capability of methods and instruments. The MRLs are adjusted based on the sample matrix and any necessary sample dilutions. Dilutions will only be performed after method-required cleanup procedures and where target analyte concentrations exceed the highest calibration standard. Routine laboratory MRLs for target analytes are listed in Table 4.

4.0 SAMPLING PROCEDURES

Sampling procedures are consistent with the project objectives described in Section 1.2. Sampling procedures are also discussed in the SAP. This section summarizes field measurement procedures, sample handling, and coordination procedures between the sampling team and analytical laboratories.

4.1 Soil Sampling

Soil samples will be collected using EPA Method 5035. Duplicate samples are impossible when using Method 5035 due to the inability to handle the sample without loss of accuracy. Co-located samples will be collected at a frequency of 10% and will represent duplicate sampling for this project.

4.2 Ground Water, Seep, and Process Water Sampling

The ground water sampling program consists of collecting ground water samples as described in the WP and SAP. The section below briefly describes ground water sampling procedures. Purging is performed using low-flow purging techniques as described in the SAP. Purge water is directed through a flow-through cell (to prevent contact with air).

- Purging will be done at a rate of approximately 0.2 to 0.5 liters per minute and the purge water will be directed through the flow cell.
- Field parameters will be monitored every three to five minutes during purging.
- Purging is complete when field parameters have stabilized for at least three consecutive readings of the field water quality parameters as follows:
    - pH: +/- 0.1 pH units
    - Specific conductance: +/- 3%
    - ORP: +/- 10 millivolts (optional)
    - Dissolved oxygen: +/- 0.3 mg/L (optional)
    - Temperature: +/- 0.1^{o}C

After parameters have stabilized, the pump discharge hose is disconnected from the flow cell. Sample containers are filled directly with discharge from the peristaltic pump.

Seep and process water from the water treatment plant will not be purged because these sources are under constant flow and are representative without the need for purging.

4.3 Indoor Air Sampling

Indoor air samples will be collected in Tedlar bags or Summa canisters per laboratory direction.

4.4 Sample Handling, Containers, Preservation, and Holding Times

Sample containers, preservation, and holding times are summarized in Table 5. Soil and water samples will be collected in glass or plastic containers supplied by the project laboratory. The containers will have screw-type lids to ensure adequate sealing of the bottles.

Commercially available pre-cleaned containers will be used and the laboratory will maintain a record of certification from the supplier. Each container lot is labeled for traceability and the container supplier will provide a certified analysis for each sample container lot upon request.

Prior to the sampling event, EPI or WCEC and ELI will coordinate the container order. Before shipment to the field, the project laboratory will add the required preservatives to the sample bottles. All samples will be placed in the appropriate sample container and refrigerated (on ice or ice-substitute in a cooler) immediately upon sample collection. The samples will be transferred to the project laboratory as soon as possible using chain-of-custody procedures as described in the SAP. Upon receipt at the laboratory, a cooler receipt form will be filled out to document sample condition.

4.5 Coordination with Analytical Laboratory

EPI and WCEC will work closely with the project laboratory to ensure that samples are handled and analyzed following procedures described in this QAPP. A schedule of fieldwork and sampling will be established approximately two weeks before commencement of fieldwork. To ensure that holding times are met, EPI and WCEC will plan and schedule sampling events in advance and coordinate with ELI.

4.6 Field Quality Control Samples

Field QC checks are accomplished through the analysis of controlled samples that are introduced to the laboratory from the field. Field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), and trip blanks will be collected and submitted to the project laboratory, where applicable, to provide a means of assessing the quality of data resulting from the field sampling program as shown in Table 5. Dedicated equipment is to be used at each sampling location, thus, rinsate samples are not necessary.

4.6.1 Field Duplicates

Field duplicate samples are used to check for sampling and analysis reproducibility. Field duplicates are submitted to the project laboratory at a frequency of 10% of the field samples for every analytical method. Control limits for field duplicate precision are 20% RPD for aqueous samples.

4.6.2 Matrix Spike/Matrix Spike Duplicates

MS/MSDs are used to assess sample matrix interferences and analytical errors, as well as to measure the accuracy and precision of the analysis. The MS/MSDs are collected and analyzed at a rate of 5% of the field samples for each matrix and analytical method or at least one for each analytical batch, whichever frequency is greater. Caution should be exercised in sample selection as a large contaminant concentration may mask the MS signal. Known concentrations of analytes are added to environmental samples, the MS or MSD is then processed through the entire analytical procedure, and the recovery of the analytes calculated. Results are expressed as percent recovery of the known spiked amount (and RPD for MS/MSD pairs). Laboratory acceptance criteria for blank spike data are included in Table 3.

4.6.3 Trip Blank

A trip blank is a distilled, deionized water sample, which originates at the project laboratory. This sample travels with the empty water-sample containers to the field, is present in the cooler during sampling, and is shipped back to the project laboratory with the field samples. Trip blanks monitor potential cross-contamination during sample handling and shipping. All trip blanks will be analyzed for VOCs. One trip blank sample is collected for each sampling event.

5.0 SAMPLE CUSTODY PROCEDURES

Samples collected during this investigation represent physical evidence collected from the field. Because of the potential use of these samples as evidence, their possession must be traceable from collection until the data are ultimately used. Chain-of-custody procedures are used to maintain and document sample possession. The principal documents used are:

- Sample labels.
- Sample custody seals.
- Field sampling records.
- Chain-of-custody forms.

Strict chain-of-custody procedures will be followed to insure sample integrity and accountability during the project. The chain of custody will begin when the sample is collected and will be maintained until final disposal of the sample.

5.1 Sample Identification and Labels

Each sample container will be labeled with a unique and appropriate sample number and designation code. The protocol for sample labeling is indicated in the SAP.

5.2 Field Custody and Chain-of-Custody Forms

The Field Team Leader or designated representative is responsible for the custody of the samples until they are formally transferred to another party or delivered to the analytical laboratory. For purposes of this project, a sample is under a person's custody if the sample meets any of the following:

- Is in possession of the field QA officer/designated representative.
- Is in a person's plain view after being in his/her possession.
- Is inside a cooler in a person's plain view.
- Is inside any locked space, such as a locked vehicle, to which the field representative has the only immediately available key.

Any transfer of samples will be accompanied by a properly completed chain-of-custody form. When transferring the possession of samples, both the individuals relinquishing and receiving the samples will sign, date, and record the time on the chain-of-custody form. This record is signed by the sampler and any others who subsequently hold custody of the samples, including another person or permanent laboratory. A copy of the chain-of-custody form will be retained by the sampler and maintained in the project files. The original form will accompany the samples.

The chain-of-custody forms will contain, at the minimum, the following information:

- Sample identification.
- Signature or initials of the sampler.
- Date and time of sample collection.
- Sample matrix.
- Signatures of all persons involved in the chain of possession.

- Inclusive dates and times of possession.
- Conditions of samples when received by each person on the form.

The chain-of-custody form will also be used to indicate what analyses are to be performed on each sample. This enables the laboratory to ascertain at the time of sample receipt whether all of the samples that are expected have arrived.

5.3 Sample Transportation

Samples will be shipped to ELI for analysis after each day of sampling following standard chain-of-custody procedures. ELI's address is given below:

Energy Laboratories, Incorporated
3161 East Lyndale Avenue
Helena, MT 59604
Contact: Mr. Jon Hager (406) 442-0711

5.4 Laboratory Custody

A designated laboratory sample custodian accepts custody of the samples and verifies that the chain-of-custody form matches the samples received. Samples are logged in and assigned a unique laboratory sample identification number. Samples and sample aliquots, including sample extracts, are tracked through laboratory analysis using laboratory sampling routing forms. Details of the analytical laboratory's sample control, record keeping, and document control are presented in ELI's Quality Assurance Manual.

5.5 Sample Documentation

All original field record and laboratory data reports will be stored in a project file at EPI's Issaquah, Washington office. EPI will file and maintain records, reports, field notebooks, and subcontractor reports and, at minimum, records will include the following:

- Field logbooks.
- Drawings.
- Photographs.
- Calculations.
- Sampling records.
- Chain-of-custody forms.
- Laboratory data.
- Data validation reports.
- Data assessment reports.
- Interim project reports, progress reports, QA reports, etc.

6.0 INSTRUMENT CALIBRATION AND MAINTENANCE

Analytical instrument calibration and maintenance is conducted in accordance with the QC requirements identified in each laboratory SOP and QA Plan, and the manufacturer's instructions. General requirements are discussed below.

6.1 Field Measurement Instrument Calibration Procedures

The calibration and general maintenance of field instruments is the responsibility of the Field Team Leader. All calibration procedures and measurements are made in accordance with manufacturers' specifications. Field instruments are checked and calibrated before their use on-site, and batteries are charged and checked daily. Instrument calibration is checked at the beginning of each workday and checked and recalibrated if necessary through the course of the day according to manufacturers' specifications or if deemed necessary by sampling personnel. Special attention is given to instruments that may drift with change in ambient temperature.

Equipment that fails calibration and/or becomes otherwise inoperable during the field investigation will be removed and either repaired or replaced.

All documentation pertinent to the calibration and/or maintenance of field equipment will be maintained in an active field logbook. Logbook entries regarding the status of field equipment will contain, but will not necessarily be limited to, the following information:

- Date and time of calibration and name of person conducting calibration.
- Type of equipment being calibrated (make and model).
- Reference standard used for calibration (such as pH of buffer solutions). When calibrating for pH or specific conductance, calibrate with two solutions of known values that bracket the expected range of sample pH or conductivity.
- Other pertinent information.

6.2 Laboratory Instrument Calibration

As stated in EPA SW-846 (EPA, 2007) and applicable laboratory SOPs, calibration of all analytical instrumentation is required to ensure that the analytical system is operating correctly and functioning at the sensitivity required to meet project-specific DQOs. Each instrument will be calibrated with standard solutions appropriate to the instrument and analytical method, in accordance with the methodology specified, and at the QC frequency specified in the project laboratory SOPs.

The calibration and maintenance history of the fixed project laboratory instrumentation is an important aspect of the project's overall QA/QC program. As such, all initial and continuing calibration procedures will be implemented by trained personnel following the manufacturer's instructions and in accordance with applicable EPA (or appropriate method) protocols to ensure the equipment is functioning within the tolerances established by the manufacturer and the method-specific analytical requirements. All laboratory instruments will be calibrated according to manufacturers' instructions as specified in ELI's Quality Assurance Plan.

7.0 ANALYTICAL PROCEDURES

This section describes the analytical procedures to be used for project laboratory measurements. The analytical methods and associated QA/QC procedures were selected based on consideration of the DQOs. The analytical methods, calibration procedures, and QC measurements and criteria are based on current analytical protocols in the following:

- EPA SW-846 (SW-846) Test Methods for Evaluation of Solid Waste (EPA, 2007).
- Methods for the Chemical Analysis of Water and Wastes (EPA, 1983).
- American Public Health Association Standard Methods for the Examination of Water and Wastewater, 21st Edition (APHA, 2007).
- Massachusetts State Department of Environmental Protection "Implementation of the MA DEP VPH/EPH Approach, Policy #WSC-01-411, October 31, 2002 (MA DEP, 1997).
- Laboratory-specific SOPs.

Soil, ground water, process water, and air samples will be analyzed using the following methods:

- Gasoling-range petroleum hydrocarbons by MA-VPH and NBWTPH-Gx.
- Drinking water VOCs by SW-846 EPA E524.2.
- Benzene, toluene, ethylbenzene, and xylenes by SW-846 EPA 8021.

Laboratory QA will be implemented and maintained as described in this plan and according to ELI's Laboratory Quality Assurance Plan and SOPs. QC samples are described in Section 4. Analytical method target analytes, routine reporting limits, and control limits are listed in Table 4.

The methods selected are sufficient to meet the project DQOs. While a best effort will be made to achieve the project DQOs, there may be cases in which it is not possible to meet the specified goals. Any limitation in data quality due to analytical problems (e.g., elevated detection limits due to highly contaminated samples) will be identified within 48 hours and brought to the attention of the EPI Project Manager. The laboratory will demonstrate that they tried cleanup procedures, as recommended in the applicable methods, to deal with suspected matrix effects. In addition, this information will be discussed in the data evaluation report.

8.0 INTERNAL QUALITY CONTROL SAMPLES

This section describes field and laboratory QC checks.

8.1 Field Quality Control Check

Assessment of field sampling precision and bias will be made by collecting field duplicates for laboratory analysis. Collection of these samples will be accordance with the applicable procedures and frequency described in Section 4.

8.2 Laboratory Quality Control Checks

Laboratory QC checks are accomplished through analyzing initial and continuing calibration samples, method blanks, surrogate spikes, laboratory control samples (LCS), and laboratory duplicate samples. Method-specific QC samples are described in the laboratory SOPs and summarized in Table 6.

8.2.1 Initial and Continuing Calibration

Laboratory instrument calibration and maintenance requirements are discussed in Section 6.

8.2.2 Method Blanks

Method blanks are used to check for laboratory contamination and instrument bias. Laboratory method blanks will be analyzed at a minimum frequency of 5% or one per analytical batch for all chemical parameter groups.

Quality control criteria require that no contaminants be detected in the blank(s) at or above the method reporting level. If a chemical is detected, the action taken will follow the laboratory SOPs as modified. Blank samples will be analyzed for the same parameters as the associated field samples.

8.2.3 Surrogate Spikes

Accuracy of an analytical measurement is evaluated by using surrogate spikes. Surrogate compounds are compounds not expected to be found in environmental samples; however, they are chemically similar to several compounds analyzed in the methods and behave similarly in extracting solvents. Samples for organics analysis will be spiked with surrogate compounds consistent with the requirements described in the laboratory SOPs.

Percent recovery of surrogates is calculated concurrently with the analytes of interest. Since sample characteristics will affect the percent recovery, the percent recovery is a measure of accuracy of the overall analytical method on each individual sample.

8.2.4 Laboratory Control Samples

LCSs are used to monitor the laboratory's day-to-day performance of routine analytical methods, independent of matrix effects. The LCS is prepared by spiking reagent water with standard solutions prepared independently of those used in establishing instrument calibration. The LCSs are extracted and analyzed with each batch of samples. Results are compared on a per-batch basis to established control limits and are used to evaluate laboratory performance for precision and accuracy. LCSs may also be used to identify any background contamination of the analytical system that may lead to the reporting of elevated concentration levels or false-positive measurements.

8.2.5 Laboratory Duplicate Samples

Precision of the analytical system is evaluated by using laboratory duplicates. Laboratory duplicates are two portions of a single homogeneous sample analyzed for the same parameter. Laboratory duplicates are prepared and analyzed with project samples.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

The process of data reduction, review, and reporting is applicable to all aspects of the project (e.g., field activities, laboratory analyses, and analytical data review) and is required for both technical and managerial data. All data generated through field activities or by the laboratory operation shall be reduced and validated prior to reporting. The following sections describe the process of handling data in terms of data generation, checking, and formatted reports for both field sampling and laboratory analysis data.

9.1 Data Reduction

Data, both field and laboratory generated, are reduced either manually on calculation sheets or by computer on formatted printouts. Responsibilities for the data reduction process are delegated as follows:

- Technical personnel will document and review their own work and are responsible for the correctness of the work.
- Major calculations will receive a method and calculation check by a secondary reviewer prior to reporting (peer review).
- The Laboratory QA Officer will be responsible for ensuring that data reduction is performed according to protocols discussed in this QAPP.

9.2 Laboratory Data

9.2.1 In-Laboratory Data Reduction and Verification

All data generated by the laboratory will be reviewed prior to data release. The ELI Laboratory Quality Assurance Program indicates that 100% of the data generated by ELI undergo multiple levels of review. The levels of review consist of analyst, peer, supervisory, and administrative. Additionally, Quality Assurance personnel review 10% or more of the completed packages for accuracy, overall compliance, and completeness.

9.2.2 Laboratory Data Reporting

Data deliverables will be submitted to EPI for verification and validation as appropriate. A summary laboratory data package will be submitted to EPI for each analytical batch. Data deliverables will include:

- Cover letter, which identifies the laboratory analytical batch number, matrix and number of samples included, and analyses performed and analytical methods used. Cover letters for Level I data summary packages also summarize any anomalies or discrepancies with the analytical data.
- Chain-of-custody and cooler receipt forms.
- Holding time (dates sampled, received, extracted, and analyzed) clearly specified.
- Tabulated sample analytical results with units, data qualifiers, sample volume, dilution factor, laboratory batch and sample number, and EPI sample identification.
- Compound quantitation and reported detection limits.
- Blank summary results.
- MS/MSD result summaries with calculated percent recovery and relative percent differences.

- LCS results when performed, with calculated percent recovery.
- Surrogate recoveries for organic analyses.
- Duplicate analyses (laboratory duplicates).
- Data qualifiers assigned by the laboratory.

9.2.3 Data Review

The Project Chemist will perform a Level I data review on all analytical data reports. The data review process quantifies the data quality, both technical and evidentiary, verifies that adequate documentation was performed, and determines whether the analytical data is usable and meets analytical DQOs presented in Tables 1 through 6.

Technical review requires comparison of QC to the required control limits. The following QC elements will be reviewed as appropriate:

- Compliance with the QAPP.
- Proper sample collection and handling procedures.
- Holding times and sample receipt conditions.
- The laboratory data package for transcription errors, misidentifications, or miscalculations.
- The cover letter.
- Compound quantitation and reported detection limits.
- Blanks summary results (e.g., method or trip).
- Surrogate percent recoveries.
- Duplicate analyses (laboratory duplicates and MS/MSDs).
- MS/MSDs.
- Field QC results.
- The reliability of data based on QC sample results.
- Data qualifiers assigned by the laboratory.
- Data completeness and format.
- Overall assessment of data for the project.

The data quality review process for this project will follow the procedures in EPA's Functional Guidelines (EPA, 1994 and 1999), as appropriate, but as applicable to EPA SW-846, this QAPP, method SOPs, and professional judgment.

Qualifiers applied to the data as a result of the independent review will be limited to:

U The analyte was analyzed for but was not detected above the sample-specific reporting limit.

J The analyte was positively identified; the associated numerical value is an estimate of the concentration of the analyte in the sample.

UJ The analyte was not detected above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

9.2.4 Data Review Reporting

Results of the QA review and/or validation will be included in a data quality review report, which will provide a basis for meaningful interpretation of the data quality and evaluate the need for corrective actions and/or comprehensive data validation. This report will be used to generate the QC summary report.

The QA review reports will be submitted to the EPI Project Manager 30 days after receipt of all laboratory data.

10.0 PERFORMANCE AND SYSTEM AUDITS

Performance and systems audits may be conducted to determine whether:

- The QA program has been documented in accordance with specified requirements.
- The documented program has been implemented.
- Any non-conformances were identified and corrective action was implemented.

The project QA/QC Officer is responsible for initiating audits and overseeing audit implementation and, if necessary, corrective actions.

10.1 Data Quality Audits (Independent Data Validation)

Data generated by the laboratory undergoes a Level II verification by the QA Officer, designated staff, or consultant. Laboratory data will be evaluated for compliance with DQOs, and with procedural requirements contained in this QAPP. The detailed scope of this validation is presented in Section 9: Data Reduction, Validation, and Reporting.

10.2 Laboratory Audits

ELI is certified under the Safe Drinking Water Act by Region 8 EPA and the State of Montana Department of Environmental Quality to perform the methods listed in this QAPP. ELI also participates in the EPA Contract Laboratory Program (CLP), multiple performance evaluation programs, and is subject to the QC requirements and audits of these programs. For this reason, no laboratory audit is currently planned. If a problem is identified, a systems or performance audit of the laboratory will be conducted in order to identify and correct specific problems.

10.3 Field Audits

Field audits will be conducted if the Project QA Officer identifies the need.

11.0 PREVENTATIVE MAINTENANCE

Field and laboratory instruments will be examined and tested prior to being put into service and will be maintained according to the manufacturers' instructions. Sampling personnel shall maintain a supply of typical maintenance replacement items available in the field to help prevent downtime because of equipment malfunctions. Examples of typical equipment maintenance items may include but not be limited to batteries, filters, tubing, fittings, sample containers, and calibration standards.

11.1 Field Instruments

The Yellow Springs Instrument (YSI) Model YSI-556 (or equivalent) will be used to measure ground water parameters. The YSI-556 (or equivalent) will be serviced as required by the manufacturer's instructions. The instrument will be calibrated for the following parameters:

- pH (YSI 5580 Confidence solution, 4.0, 7.0, and 10.0 buffer solutions, or equivalent).
- Conductivity (YSI 5580 Confidence solution or equivalent).
- Oxidation-Reduction Potential (YSI 5580 Confidence solution, Zobell solution, or equivalent).

Manufacturers' instructions will be followed for any additional equipment that is required for the project.

11.2 Laboratory Instruments

All laboratory instruments will be maintained according to manufacturers' instructions as specified in ELI's Quality Assurance Plan (ELI, 2008).

12.0 CORRECTIVE ACTIONS

Corrective actions may be required for two classes of problems: analytical and equipment problems and non-compliance problems. Analytical and equipment problems may occur during sampling, sample handling, sample preparation, laboratory analysis, and data review. For non-compliance problems, a formal corrective action program is determined and implemented at the time the problem is identified. The QA Officer is responsible for notifying the Project Manager. Any non-conformance with the established quality control procedures in the QAPP or SAP is identified and corrected in accordance with the QAPP. Corrective actions will be implemented and documented in the field record book.

12.1 Field Corrections

Technical staff and project personnel are responsible for reporting all suspected technical or QA non-conformances or suspected deficiencies of any activity or issued document by reporting the situation to the Project Manager. The manager is responsible for assessing the suspected problems in consultation with the QA Officer and making a decision based on the potential for the situation to impact the quality of the data. If it is determined that the situation warrants a reportable non-conformance requiring corrective action, then a non-conformance report shall be initiated by the manager.

If appropriate, the Field Team Leader will ensure that no additional work dependent on the non-conforming activity is performed until corrective actions are completed. Corrective action for field measurements may include the following:

- Repeat the measurement to check the error.
- Check power supplies.
- Check the calibration.
- Replace the instrument or measurement device.
- Retraining field personnel.
- Stop work (if necessary).

Corrective measures are determined and then implemented. The technical staff member is to document the problem, the correction, and the results.

12.2 Laboratory Corrections

The need for correction(s) in the analytical laboratory may come from several sources including equipment malfunction, failure of internal QA/QC checks, method blank contamination, failure of performance or system audits; and/or non-compliance with QA requirements. When measurement equipment or analytical methods fail QA/QC checks, the problem is to be immediately brought to the attention of the appropriate Laboratory QA Officer and other persons in the laboratory in accordance with the laboratory's SOP. Any limitation in data quality due to analytical problems will be identified within 48 hours and brought to the attention of the EPI Project Manager. The laboratory will demonstrate that it tried cleanup procedures, as recommended in the applicable methods, to deal with suspected matrix effects. In addition, this information will be discussed in the data evaluation report.

12.3 Reconciliation with User Requirements

The project QC Officer and EPI Project Manager will review the field and laboratory data generated for this project to ensure that all project quality assurance objectives are met. If any non-conformances are found in the field procedures, sample collection procedures, field documentation procedures, laboratory analytical and documentation procedures, and/or data evaluation and quality review procedures, the impact of those non-conformances on the overall project QA objectives will be assessed. Appropriate actions, including re-sampling and re-analysis, may be recommended to the EPI and EPA Project Managers so that the project objectives can be accomplished.

13.0 QUALITY CONTROL REPORTS

After the fieldwork and the final analyses have been completed and reviewed, a final QC summary report is prepared by the project QA Officer. The report summarizes the QA and audit information, indicating any corrective actions taken and the overall results of SAP compliance. The QC summary report is to be included in the central project file and incorporated as part of the semi-annual or final report.

The QC summary report provides a basis for meaningful interpretation of the data quality and evaluates the need for corrective actions and/or comprehensive data validation. Analytical data are qualified by reviewing the laboratory's standard analytical QC such as laboratory blank, duplicate, LCS, MS/MSD, and surrogate recoveries. The data quality review involves checking the laboratory data package against criteria established in the QAPP. The data will be considered valid if they meet the criteria established in the method SOPs, this QAPP, laboratory data validation guidelines (EPA, 1994 and 1999), and professional judgment for the following elements:

- Accuracy
- Precision
- Completeness
- Representativeness
- Comparability
- Sensitivity

The data validation report includes an evaluation of sampling documentation, representativeness, technical holding time, field and laboratory blank sample analyses, method QC sample results, field duplicates, and compound identification and quantitation.

14.0 REFERENCES

APHA, 2007	American Public Health Association. Standard Methods for Examination of Water and Wastewater, 21st Edition. 2007.
ELI, 2008	Energy laboratories, Inc. Quality Assurance Plan for Helen, Montana Lab – LQAP. April 2008.
EPA, 1983	United States Environmental Protection Agency. Methods for the Chemical Analysis of Water and Wastes. EPA 600/4-79-020. 1983.
EPA, 1994	United States Environmental Protection Agency. Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review. EPA-540-R-02-003. February 1994.
EPA, 1999	United States Environmental Protection Agency. Contract Laboratory Program, National Functional Guidelines for Organic Data Review. EPA-540/R-99/008. October 1999.
EPA, 2007	United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. Test Methods for Evaluation of Solid Waste, Vol. II: Field Manual Physical/Chemical Methods (SW-846), 3rd Edition and Revised Update II. February 2007.
MA DEP, 2002	Massachusetts State Department of Environmental Protection “Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MA DEP VPH/EPH Approach,” Policy #WSC-01-411, October 31, 2002.

TABLES

Table 1. Sample Types and Procedures Used To Evaluate Data Quality

Keller Trucking Fuel Truck Spill, Polson, Montana

Data Quality Indicator	Field and Laboratory QA Sample Type/Procedure
Precision	Field Duplicate Laboratory Duplicate Matrix Spike Duplicate
Accuracy	Matrix Spike Surrogate Spike Laboratory Control Sample Trip Blank Method Blank
Representativeness	Trip Blank Method Blank Chain of Custody Holding Times
Comparability	Method Detection Limits Method Reporting Limits Sample Collection Methods Laboratory Analytical Methods
Completeness	Data Qualifiers Laboratory Deliverables Requested / Reported Results
Sensitivity	Method Detection Limits Method Reporting Limits

Table 2. Investigation Monitoring Analytical Program
Keller Trucking Fuel Truck Spill, Polson, Montana

Parameter			Number of Samples				
	Method	**Medium**	**Primary**	**Field Duplicate (10%)**	**MS/MSD (5%)**	**Trip Blank (5%)**	**Total**
Gasoline-range Petroleum Hydrocarbons	MA-VPH	soil					
		water					
		air					
Volatile Organic Compounds (drinking water method)	EPA E524.2	water					
BTEX	EPA 8021	soil					
		water					
Gasoline-range Petroleum Hydrocarbons	NWTPH-Gx	soil					
		water					

Notes:
Sampling events are described in WP and SAP.
Quantities are estimated.
Samples will be collected according to tables in WP and SAP

Table 3. Accuracy, Precision, and Completeness Goals
Keller Trucking Fuel Truck Spill, Polson, Montana

Parameters	Analytical Method	Laboratory Control Sample Accuracy (% Recovery)	Matrix Spike Sample Accuracy (% Recovery)	Precision (RPD) (Dup or MS/MSD)	Completeness
Gasoling-range Petroleum Hydrocarbons					
Methyl tert-butyl ether (MTBE)	MA-VPH	75-125	75-125	20%	90%
Benzene	MA-VPH	75-125	75-125	20%	90%
Toluene	MA-VPH	75-125	75-125	20%	90%
Ethylbenzene	MA-VPH	75-125	75-125	20%	90%
m, p-Xylene	MA-VPH	75-125	75-125	20%	90%
o-Xylene	MA-VPH	75-125	75-125	20%	90%
Xylenes, total	MA-VPH	75-125	75-125	20%	90%
Naphthalene	MA-VPH	75-125	75-125	20%	90%
C9 to C10 Aromatics	MA-VPH	75-125	75-125	20%	90%
C5 to C8 Aliphatics	MA-VPH	75-125	75-125	20%	90%
C9 to C12 Aliphatics	MA-VPH	75-125	75-125	20%	90%
Toal Purgeable Hydrocarbons	MA-VPH	75-125	75-125	20%	90%
Volatile Organic Compounds					
Benzene	EPA E524.2	70-130	70-130	20%	90%
Bromobenzene	EPA E524.2	70-130	70-130	20%	90%
Bromochloromethane	EPA E524.2	70-130	70-130	20%	90%
Bromodichloromethane	EPA E524.2	70-130	70-130	20%	90%
Bromoform	EPA E524.2	70-130	70-130	20%	90%
Bromomethane	EPA E524.2	70-130	70-130	20%	90%
n-, sec- and tert-Butylbenene	EPA E524.2	70-130	70-130	20%	90%
Carbon tetrachloride	EPA E524.2	70-130	70-130	20%	90%
1,2-Dichloroethane	EPA E524.2	70-130	70-130	20%	90%
Chlorobenzene	EPA E524.2	70-130	70-130	20%	90%
Chlorodibromemethane	EPA E524.2	70-130	70-130	20%	90%
Chloroethane	EPA E524.2	70-130	70-130	20%	90%
Chloroform	EPA E524.2	70-130	70-130	20%	90%
Chloromethane	EPA E524.2	70-130	70-130	20%	90%
2- and 4-Chlorotoluene	EPA E524.2	70-130	70-130	20%	90%
1,2-Dibromo-3-chloropropane	EPA E524.2	70-130	70-130	20%	90%
Dibromomethane	EPA E524.2	70-130	70-130	20%	90%
1,2-, 1,3, and 1,4--Dichlorobenzene	EPA E524.2	70-130	70-130	20%	90%
Dichlorodifluoromethane	EPA E524.2	70-130	70-130	20%	90%
1,1-Dichloroethane	EPA E524.2	70-130	70-130	20%	90%
1,2-Dibromoethane	EPA E524.2	70-130	70-130	20%	90%
1,1-, cis-1,2, and trans-1,2-Dichloroethene	EPA E524.2	70-130	70-130	20%	90%
1,2- 1,3-, and 2,2-Dichloropropane	EPA E524.2	70-130	70-130	20%	90%
1,1-, cis-1,3, and trans-1,3-Dichloropropene	EPA E524.2	70-130	70-130	20%	90%
Ethylbenzene	EPA E524.2	70-130	70-130	20%	90%
Hexachlorobutadiene	EPA E524.2	70-130	70-130	20%	90%
Isopropylbenzene	EPA E524.2	70-130	70-130	20%	90%
p-Isopropyltoluene	EPA E524.2	70-130	70-130	20%	90%
Methyl-tert-butyl ether (MTBE)	EPA E524.2	70-130	70-130	20%	90%
Methylene chloride	EPA E524.2	70-130	70-130	20%	90%
Naphthalene	EPA E524.2	70-130	70-130	20%	90%
n-Propylbenzene	EPA E524.2	70-130	70-130	20%	90%
Styrene	EPA E524.2	70-130	70-130	20%	90%
1,1,1,2- and 1,1,2,2-Tetrachloroethane	EPA E524.2	70-130	70-130	20%	90%
Tetrachloroethene	EPA E524.2	70-130	70-130	20%	90%
Toluene	EPA E524.2	70-130	70-130	20%	90%
1,2,3- and 1,2,4-Trichlorobenzene	EPA E524.2	70-130	70-130	20%	90%
1,1,1- and 1,1,2-Trichloroethane	EPA E524.2	70-130	70-130	20%	90%
Trichloroethene	EPA E524.2	70-130	70-130	20%	90%
Trichlorofluoromethane	EPA E524.2	70-130	70-130	20%	90%
1,2,3-Trichloropropane	EPA E524.2	70-130	70-130	20%	90%
1,2,4- and 1,3,5-Trimethlybenzene	EPA E524.2	70-130	70-130	20%	90%
Vinyl chloride	EPA E524.2	70-130	70-130	20%	90%
m+p-Xylenes	EPA E524.2	70-130	70-130	20%	90%
o-Xylene	EPA E524.2	70-130	70-130	20%	90%
Trihalomethanes, Total	EPA E524.2	70-130	70-130	20%	90%
Xylenes, Total	EPA E524.2	70-130	70-130	20%	90%
BTEX					
Benzene	EPA 8021	70-130	70-130	20%	90%
Toluene	EPA 8021	70-130	70-130	20%	90%
Ethylbenzene	EPA 8021	70-130	70-130	20%	90%
Xylenes (total)	EPA 8021	70-130	70-130	20%	90%
Gasoling-range Petroleum Hydrocarbons					
GRPH	NWTPH-Gx	75-125	75-125	20%	90%

Table 4. Analytes and Method Detection and Method Reporting Limits
Keller Trucking Fuel Truck Spill, Polson, Montana

Analyte	Method	Method Detection Limit [1]	Method Reporting Limit [1]	Units
Gasoling-range Petroleum Hydrocarbons				
Methyl tert-butyl ether (MTBE)	MA-VPH		1.0	µg/L
Benzene	MA-VPH	0.03	0.50	µg/L
Toluene	MA-VPH	0.036	0.50	µg/L
Ethylbenzene	MA-VPH	0.026	0.50	µg/L
m, p-Xylene	MA-VPH	0.044	0.50	µg/L
o-Xylene	MA-VPH	0.036	0.50	µg/L
Xylenes, total	MA-VPH	0.044	0.50	µg/L
Naphthalene	MA-VPH		1.0	µg/L
C9 to C10 Aromatics	MA-VPH		20	µg/L
C5 to C8 Aliphatics	MA-VPH		20	µg/L
C9 to C12 Aliphatics	MA-VPH		20	µg/L
Total Purgeable Hydrocarbons	MA-VPH		20	µg/L
Volatile Organic Compounds				
Benzene	EPA E524.2	0.807	0.5	µg/L
Bromobenzene	EPA E524.2	0.03	0.5	µg/L
Bromochloromethane	EPA E524.2	0.024	0.5	µg/L
Bromodichloromethane	EPA E524.2	0.084	0.5	µg/L
Bromoform	EPA E524.2	0.095	0.5	µg/L
Bromomethane	EPA E524.2	0.663	0.5	µg/L
n-, sec- and tert-Butylbenene	EPA E524.2	0.049	0.5	µg/L
Carbon tetrachloride	EPA E524.2	0.043	0.5	µg/L
1,2-Dichloroethane	EPA E524.2	0.025	0.5	µg/L
Chlorobenzene	EPA E524.2	0.077	0.5	µg/L
Chlorodibromemethane	EPA E524.2	0.042	0.5	µg/L
Chloroethane	EPA E524.2	0.109	0.5	µg/L
Chloroform	EPA E524.2	0.046	0.5	µg/L
Chloromethane	EPA E524.2	0.053	0.5	µg/L
2- and 4-Chlorotoluene	EPA E524.2	0.048	0.5	µg/L
1,2-Dibromo-3-chloropropane	EPA E524.2	0.043	1.0	µg/L
Dibromomethane	EPA E524.2	0.038	0.5	µg/L
1,2-, 1,3, and 1,4--Dichlorobenzene	EPA E524.2	0.041	0.5	µg/L
Dichlorodifluoromethane	EPA E524.2	0.055	0.5	µg/L
1,1-Dichloroethane	EPA E524.2	0.046	0.5	µg/L
1,2-Dibromoethane	EPA E524.2	0.006	0.5	µg/L
1,1-, cis-1,2, and trans-1,2-Dichloroethene	EPA E524.2	0.018	0.5	µg/L
1,2- 1,3-, and 2,2-Dichloropropane	EPA E524.2	0.026	0.5	µg/L
1,1-, cis-1,3, and trans-1,3-Dichloropropene	EPA E524.2	1.064	0.5	µg/L
Ethylbenzene	EPA E524.2	0.052	0.5	µg/L
Hexachlorobutadiene	EPA E524.2	0.201	0.5	µg/L
Isopropylbenzene	EPA E524.2	0.018	0.5	µg/L
p-Isopropyltoluene	EPA E524.2	0.052	0.5	µg/L
Methyl-tert-butyl ether (MTBE)	EPA E524.2	0.032	0.5	µg/L
Methylene chloride	EPA E524.2	0.09	0.5	µg/L
Naphthalene	EPA E524.2	0.036	0.5	µg/L
n-Propylbenzene	EPA E524.2	0.033	0.5	µg/L
Styrene	EPA E524.2	0.03	0.5	µg/L
1,1,1,2- and 1,1,2,2-Tetrachloroethane	EPA E524.2	0.025	0.5	µg/L
Tetrachloroethene	EPA E524.2	0.09	0.5	µg/L
Toluene	EPA E524.2	0.040	0.5	µg/L
1,2,3- and 1,2,4-Trichlorobenzene	EPA E524.2	0.101	0.5	µg/L
1,1,1- and 1,1,2-Trichloroethane	EPA E524.2	0.045	0.5	µg/L
Trichloroethene	EPA E524.2	0.044	0.5	µg/L
Trichlorofluoromethane	EPA E524.2		0.5	µg/L
1,2,3-Trichloropropane	EPA E524.2		0.5	µg/L
1,2,4- and 1,3,5-Trimethlybenzene	EPA E524.2		0.5	µg/L
Vinyl chloride	EPA E524.2		0.5	µg/L
m+p-Xylenes	EPA E524.2		0.5	µg/L
o-Xylene	EPA E524.2		0.5	µg/L
Trihalomethanes, Total	EPA E524.2		0.5	µg/L
Xylenes, Total	EPA E524.2	0.036	0.5	µg/L
BTEX				
Benzene	EPA 8021	0.03	0.50	µg/L
Toluene	EPA 8021	0.036	0.50	µg/L
Ethylbenzene	EPA 8021	0.026	0.50	µg/L
Xylenes (total)	EPA 8021	0.044	0.50	µg/L
Gasoling-range Petroleum Hydrocarbons				
GRPH	NWTPH-Gx		0.5	µg/L

Notes:

µg/L - microgram per liter.

[1] Method detection limits (MDLs) and method reporting limits (MRLs) are updated periodically. MDL studies are performed in accordance with 40 CFR Part 136, Appendix B using seven (or six) degrees of freedom.

Table 5. Container, Preservation, and Holding Time Requirements

Keller Trucking Fule Truck Spill, Polson, Montana

Parameter	Matrix	Method	Container	Preservation	Maximum Holding Time
Field Screening					
pH	Water	Refer to SAP	Field Analysis	None	Analyze immediately
Temperature	Water	Refer to SAP	Field Analysis	None	Analyze immediately
Specific Conductance	Water	Refer to SAP	Field Analysis	None	Analyze immediately
Dissolved Oxygen	Water	Refer to SAP	Field Analysis	Avoid contact with air	Analyze immediately
Oxidation Reduction Potential	Water	Refer to SAP	Field Analysis	Avoid contact with air	Analyze immediately
Fixed Laboratory Analysis					
Gasoline-range Petroleum Hydrocarbons	Soil	MA-VPH	1, 4-oz clear glass jar with Teflon-lined lid, minimal headspace	Cool 4° C	28 Days
Gasoline-range Petroleum Hydrocarbons	Water	MA-VPH	(3) 40-ml VOA vials with Teflon-lined septa without headspace	Cool 4° C, HCl to pH < 2	14 Days with pH $\leq$ 2 (Note: 7 days without preservative)
Gasoline-range Petroleum Hydrocarbons	Air	MA-VPH	1-liter Tedlar bag or 1-liter Summa canister	None	7 Days
Volatile Organic Compounds	Water	EPA E524.2	(3) 40-ml VOA vials with Teflon-lined septa without headspace	Cool 4° C, HCl to pH < 2	14 Days with pH $\leq$ 2 (Note: 7 days without preservative)
BTEX	Soil	EPA 8021	1, 4-oz clear glass jar with Teflon-lined lid, minimal headspace	Cool 4° C	28 Days
BTEX	Water	EPA 8021	(3) 40-ml VOA vials with Teflon-lined septa without headspace	Cool 4° C, HCl to pH < 2	14 Days with pH $\leq$ 2 (Note: 7 days without preservative)
Gasoline-range Petroleum Hydrocarbons	Soil	NWTPH-Gx	1, 4-oz clear glass jar with Teflon-lined lid, minimal headspace	Cool 4° C	28 Days
Gasoline-range Petroleum Hydrocarbons	Water	NWTPH-Gx	(3) 40-ml VOA vials with Teflon-lined septa without headspace	Cool 4° C, HCl to pH < 2	14 Days with pH $\leq$ 2 (Note: 7 days without preservative)

Notes:

Some containers may be used for multiple analyses.

°C - Celsuis

SM - Standard Methods for Examination of Water and Wastewater

HCl - hydrochloric acid

Table 6. Laboratory Quality Assurance/Quality Control Sample Summary

Keller Trucking Fuel Truck Spill, Polson, Montana

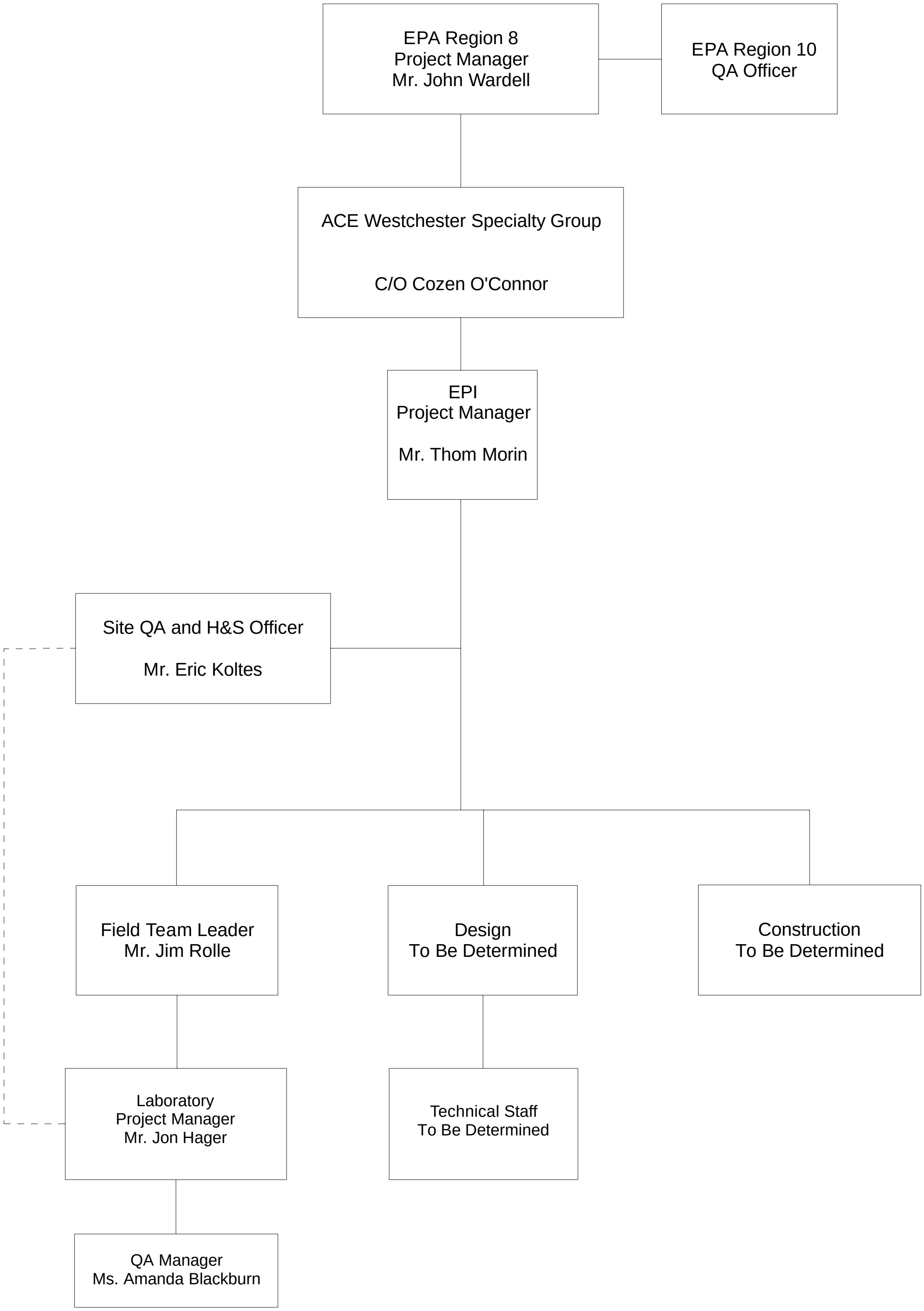
Analyte	Method	Method Blanks	Lab Duplicates	MS/MSD	LCS	Surrogate
Gasoling-range Petroleum Hydrocarbons	MA-VPH	1/batch	NA	5%	1/batch	All samples
Volatile Organic Compounds	EPA 8260B	1/batch	NA	5%	1/batch	All samples
BTEX	EPA 8021	1/batch	NA	5%	1/batch	All samples
Gasoline-range Petroleum Hydrocarbons	NWTPH-Gx	1/batch	NA	5%	1/batch	All samples

Notes:

NA = not applicable

[1] Based on Project DQOs geochemical indicator parameters are considered secondary data. Blank spike or standard reference material may substitute for matrix spike data.

FIGURE



ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 1

ORGANIZATIONAL CHART

PROJECT	56401.1		
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP		
LOCATION	HIGHWAY 35 POLSON, MONTANA		
SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*ARM*	*EMK*	*06/26/08*

Attachment D

Attachment D: DRAFT Site Health and Safety Plan for Keller Trucking Fuel Truck Spill

Montana Route 35, Mile Marker 5.2
Polson, Montana

Prepared For:

ACE Westchester Specialty Group
c/o Cozen O'Connor
1201 3rd Avenue, Suite 5200
Seattle, WA 98101

June 30, 2008

Prepared By:

Environmental Partners, Inc.
295 NE Gilman Blvd., Suite 201
Issaquah, Washington 98027
(425) 395-0010

Project Number: 56401.1

QR____ TR____

EPI CONTACTS

Thom Morin .... **(206) 954-6957 (cell)**
Eric Koltes .... **(425) 922-5666 (cell)**

WCEC CONTACT

Jim Rolle .... **(406) 549-8487**

EMERGENCY CONTACTS AND EMERGENCY INFORMATION

POLICE.. **911**
FIRE **911**
FIRST AID **911**

In the event of an emergency, be prepared to give the following information:

- Location of Emergency

  Site Location.. **Mile Marker 5.2**
  Montana Route 35
  Polson, Montana 98108

  Nearest Side Street .... **Hellroaring Road**

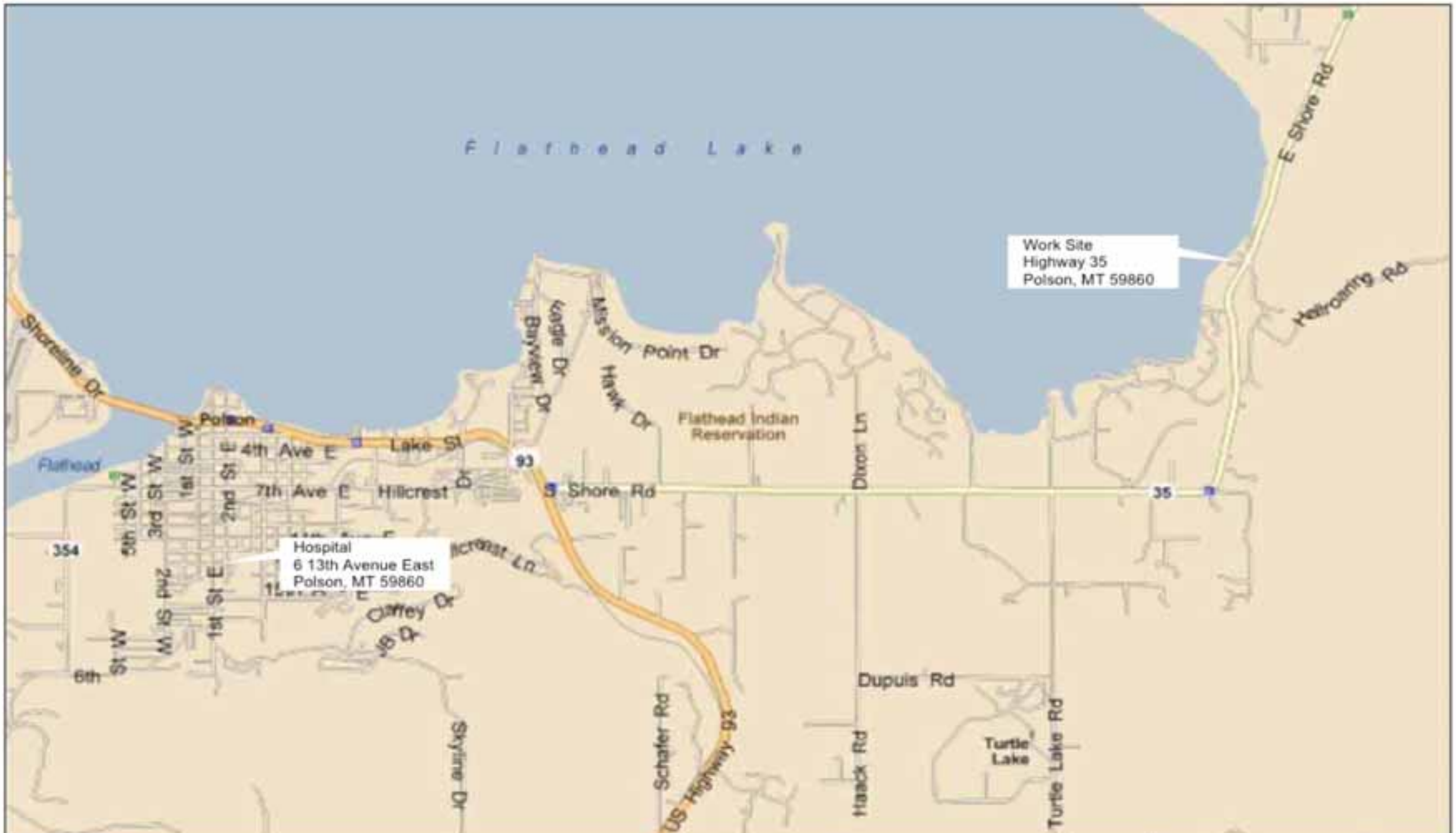
- Phone Number That You Are Calling From .... **LOOK ON PHONE**

- What Happened?
  * Type of accident
  * Type(s) of injuries
- How many people need help?

Additional Emergency Information:

- Hospital Name... **St. Joseph Medical Center**
  Address.. **6 13th Avenue East**
  City, State, Zip Code... **Polson, Montana 59860**
  Phone Number .... **(406) 883-8479**

- Note: Contact a Principal at Environmental Partners, Inc., after emergency services have been called.
  Environmental Partners, Inc. .... **(425) 395-0010**
  Thom Morin (Principal) .... **(206) 954-6957 (cell)**
  Doug Kunkel (Principal) .... **(425) 241-8170 (cell)**



KEY:

Directions to St. Joseph Medical Center
6 13th Avenue East
Polson, MT
406-883-8479

1. Take Highway 35 (Shore Rd.) south/east to Polson
2. Turn right on Route 93 (Lake St.)
3. Turn left on 1st Street East
4. Continue straight to 13th Avenue East

ENVIRONMENTAL PARTNERS INC
295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 1

ROUTE TO HOSPITAL MAP

PROJECT	56401.1		
PREPARED FOR	ACE WESTCHESTER SPECIALTY GROUP		
LOCATION	HIGHWAY 35 POLSON, MONTANA		
SHEET 1 of 1	**DRAWN BY** ARM	**REVIEWED BY** JLD	**DATE** 06/23/08

TABLE OF CONTENTS

ACRONYMS

BTEX	benzene, toluene, ethylbenzene, and xylenes
DP	direct-push
EPA	United Stats Environmental Protection Agency
EPI	Environmental Partners, Incorporated
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	immediately dangerous to life and health
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PID	photoionization detector
PPE	personal protective equipment
ppm	part per million
REL	recommended exposure limit
TPH	total petroleum hydrocarbon
TWA	time-weighted average
VOC	volatile organic compound
WCEC	West Central Environmental Consultants

1.0 PLAN OBJECTIVES AND APPLICABILITY

This Health and Safety Plan (HASP) has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA). The purpose of this health and safety plan is to establish protection standards and mandatory safe practices and procedures for all personnel involved with field activities at the site. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field activities. The plan consists of site descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

This plan will be available to all personnel involved in the site work and will be made available to all subcontractors and other workers who may need to work on-site.

Mr. Eric Koltes of Environmental Partners, Inc. (EPI) and Mr. Jim Rolle of West Central Environmental Consultants (WCEC), EPI’s on-site subcontractor, are the designated Site Health and Safety Officers. As Site Health and Safety Officer, Mr. Koltes and Mr. Rolle have total responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this Health and Safety Plan are properly implemented. In this capacity, they will conduct ongoing oversight and site inspections to ensure that this Health and Safety Plan remains current with potentially changing site conditions. They have the authority to make health and safety decisions that may not be specifically outlined in this plan, should site conditions warrant such actions. In the event that one of both leave the site while work is in progress, an alternate Site Health and Safety Officer will be designated.

The provisions and procedures outlined by this Health and Safety Plan apply to all contractors, subcontractors, owner's representatives, oversight personnel, and any other persons involved with the field activities described herein. All such persons are required to read this Health and Safety Plan and indicate that they understand its contents by signing the Site Health and Safety Officer's copy of the Plan. In addition, all such persons are required to provide documentation of their current certification under the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation, 29 CFR 1910.120.

It should be noted that this Health and Safety Plan is based on information that was available as of the date indicated on the title page. It is possible that additional hazards that are not specifically addressed by this Health and Safety Plan may exist at the work-site, or may be created as a result of on-site activities. It is EPI's firm belief that active participation in health and safety procedures and acute awareness of on-site conditions by all site workers is crucial to the health and safety of everyone involved. If you identify a site condition that is not addressed by this Health and Safety Plan, or if you have any questions or concerns about site conditions or this Plan, immediately notify the Site Health and Safety Officer. This Health and Safety Plan was prepared by Mr. Jeff Dengler, senior engineer at EPI.

2.0 BACKGROUND INFORMATION

The work site is located at: Montana Highway 35
Mile Marker 5.2 and vicinity
Polson, Montana 59860

2.1 Site History

This HASP relates specifically to ongoing monitoring and remedial cleanup actions performed in the vicinity of Mile Marker 5.2 along Montana Highway 35 northeast of Polson, Montana. On April 2, 2008, a single-vehicle accident involving a fuel tanker truck released approximately 6,000 gallons of gasoline along the highway. An emergency response team from the United States Environmental Protection Agency (EPA) coordinated the immediate response to the spill.

Petroleum-contaminated soil was excavated and ground water monitoring wells were installed as part of the initial response work. Monitoring was performed in existing and new wells near the spill area and in seeps along the shore of nearby Flathead Lake. Preliminary remedial measures for ground water interception and treatment have been taken. A number of residences near the contaminated ground water area have been temporarily abandoned due to infiltration of volatile organic compounds (VOCs) into indoor air spaces.

Soil and groundwater petroleum hydrocarbon contamination remain at the work site. The project has transitioned from an emergency response action to a longer-term evaluation and remediation effort of residual contamination. The evaluation work will locate residual contamination and identify migration pathways. The remediation work will seek to protect human health and the environment by removing or destroying residual contamination. This will be accomplished by incremental improvements to the trench interceptor collection and treatment of ground water. Remediation efforts may also include implementation of vapor mitigation work to restore the residences to a livable condition.

2.2 Site Contaminants

Site contaminants are gasoline-range total petroleum hydrocarbons (TPH). Significant from a health and safety standpoint are benzene, toluene, ethylbenzene, and xylene (BTEX) compounds found in TPH-gasoline. Other VOCs likely included among contaminants are hexane, heptane, octane, and gasoline additives such as methyl tertiary-butyl ether, dibromo- and dichloro-ethane, and naphthalene.

2.3 Scope of Work

Following is a brief summary of the on-site work activities that are anticipated and covered by this HASP:

Task 1 – Installation of new borings and wells by drilling and direct-push (DP) techniques.
Task 2 – Trenching to improve ground water interception.

Task 3 – Improvement of the existing groundwater treatment systems.
Task 4 – Soil, ground water and seep sampling.
Task 5 – Treatment system sampling.
Task 6 – Sampling indoor and ambient air at residences.

New borings and wells will be installed by a licensed, experienced drilling subcontractor. Similarly, trenching work will be performed will be licensed, experienced excavation subcontractor. A subsurface utility locating contractor will be hired to identify and mark subsurface utility locations before any subsurface work is performed.

Minor improvements to existing treatment systems will undergo internal review to verify their effectiveness and identify health and safety concerns during implementation. Outside vendors and/or consultants with appropriate expertise will be employed to identify health and safety concerns for major improvements to treatment systems.

Water and air sampling will be performed by experienced personnel familiar with the methods and instruments required for the sampling tasks. Appropriate personal protective equipment (PPE) will be worn for the sampling event. Instrumentation, if required, will be calibrated daily per manufacturer's instructions. More frequent calibration will be done if instrument readings are suspect. All calibration events will be recorded in the daily log.

3.0 HAZARD EVALUATION AND RISK ANALYSIS

In general, there are three broad hazard categories that may be encountered during site work: Chemical Exposure Hazards, Fire/Explosion Hazards, and Physical Hazards. Subsections 3.1 through 3.3 present information discussing specific hazards within each of these broad categories.

3.1 Chemical Exposure Hazards

Table 1 presents chemical-specific data regarding permissible exposure limits (PELs), likely pathways of exposure, target organs that will likely be affected by exposure, and likely symptoms of exposure for gasoline-range petroleum hydrocarbons that are present at the site. Table 1 data were compiled from the NIOSH Pocket Guide to Chemical Hazards, February 2004 edition. It should be noted that the PELs are the regulated limits; recommended exposure limits (RELs) by the National Institute for Occupational Safety and Health (NIOSH) are guidance limits and are listed as a reference.

3.2 Fire and Explosion Hazards

It is possible that vapors from the contaminated soil and ground water may be present at levels sufficient to create an explosion and/or fire hazard in an indoor situation such as a residence basement or enclosed treatment building. It is unlikely that an explosion and/or fire hazard would exist in outdoor air. It should be noted, however, that the 1996 Emergency Response Guidebook, published by the United States Department of Transportation, identifies the following explosion and/or fire hazards associated with gasoline vapors:

- Flammable/combustible material may produce vapors.
- Vapors may be ignited by heat, sparks, or flames.
- Vapors may travel to a source of ignition and flash back.
- Containers may explode in heat or fire.
- Vapor explosion hazards can exist indoors, outdoors, or in sewers.
- Run-off to sewers may cause a fire or explosion hazard

Table 1. Chemical Exposure Data

Chemical Name	PEL*	REL*	IDLH*	Exposure Route	Target Organs	Symptoms
Acetone	1,000 ppm	250 ppm	2,500 ppm	Inhalation, ingestion, skin/eye contact	Eyes, skin, respiratory system	Irritation of eyes, nose, throat; headache; dizziness; dermatitis
Benzene	1 ppm	0.1 ppm	500 ppm	Inhalation, ingestion, skin/eye contact	Blood, central nervous system, skin, bone marrow, eyes, respiratory system	Irritation of eyes, nose, respiratory; giddiness; headache; nausea; staggered gait; fatigue; anorexia; lassitude; dermatitis; bone marrow; depression
Ethyl benzene	100 ppm	100 ppm	800 ppm	Inhalation, ingestion, skin/eye contact	Eyes, upper respiratory system, skin, central nervous system	Irritation of eyes, mucous membrane; headache; dermatitis; narcosis; coma
Ethylene Dichloride	50 ppm	1 ppm	50 ppm	Inhalation, ingestion, skin/eye contact	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Irritation of eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage
Heptane	500 ppm	85 ppm	750 ppm	Inhalation, ingestion, skin/eye contact	Skin, respiratory system, central nervous system	Lightheadedness, vertigo; loss of appetite, nausea; unconsciousness
Hexane	500 ppm	50 ppm	1,100 ppm	Inhalation, ingestion, skin/eye contact	Eyes, skin, respiratory system, central nervous system, peripheral nervous system	Irritation of eyes, nose; lightheadedness; nausea
Methylene Chloride	25 ppm (29 CFR 1910.105)	Lowest possible exposure	2,300 ppm	Inhalation, ingestion, skin absorption, skin and/or eye contact	Eyes, skin, central nervous system, cardiovascular system	Irritation of eyes, skin; lightheadedness; somnolence
Toluene	200 ppm	100 ppm	500 ppm	Inhalation, absorption, ingestion, skin/eye contact	Central nervous system, liver, kidneys, skin	Fatigue; confusion, euphoria, dizziness, headache; dilated pupils; lacrimation; nervousness; insomnia; paresthesia; dermatitis
Xylene	100 ppm	100 ppm	900 ppm	Inhalation, ingestion, absorption, skin/eye contact	Central nervous system, GI tract, blood, liver, kidneys, skin	Dizziness; excitement; drowsiness; lack of coordination; staggered gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis

Notes: PEL – permissible exposure limit

REL – recommended exposure limit

IDLH – immediately dangerous to life or health

ppm – parts per million

3.3 Physical Hazards

Table 2 presents a summary of a variety of physical hazards that may be encountered on the job site. For convenience, these hazards have been categorized into several general groupings and suggested preventative measures are also included.

Table 2. Physical Hazards

Category	Cause	Prevention
Head Hazards	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards are present.
Foot/Ankle Hazards	Sharp objects, dropped objects, uneven and/or slippery surfaces, chemical exposure.	Chemical resistant, steel-toed boots must be worn at all times on-site.
Eye Hazards	Sharp objects, poor lighting, bright lights (welding equipment), exposure due to splashes.	Safety glasses/face shields will be worn when appropriate. Shaded welding protection will be worn when appropriate.
Electrical Hazards	Underground utilities, overhead utilities.	Locator service mark-outs, visual inspection of work area prior to starting work.
Mechanical Hazards	Heavy equipment such as drill rigs, service trucks, excavation equipment, saws, drills, etc.	Competent operators, backup alarms, regular maintenance, daily mechanical checks, proper guards, and high-visibility clothing.
Noise Hazards	Machinery creating >85 decibels TWA, >115 decibels continuous noise, or peak at >140 decibels.	Wear earplugs or protective ear muffs when appropriate.
Fall Hazards	Elevated and/or slippery or uneven surfaces. Trips caused by poor "house keeping" practices.	Care should be used to avoid such accidents and to maintain good “house keeping." Fall protection devices must be used when work proceeds on elevated surfaces.
Lifting Hazards	Injury due to improper lifting techniques, overreaching/overextending, heavy objects.	Use proper lifting techniques, mechanical devices where appropriate.
Lighting Accidents	Improper illumination.	Work will proceed during daylight hours only, or under sufficient artificial illumination.

Note: TWA – time-weighted average

4.0 SITE AIR MONITORING

The following section describes monitoring techniques and equipment that are to be used during site work. The Site Health and Safety Officer, or a designated alternate, is responsible for performing all monitoring activities. Air monitoring of indoor spaces will be used to determine the level of protection that is required for work to proceed safely.

4.1 Indoor Air Monitoring

Indoor air monitoring will be performed to ensure that personnel are not exposed to harmful vapor concentrations in excess of PELs. This monitoring will also be used to identify any increases in airborne contaminant concentrations during work activities.

4.1.1 Air Monitoring Equipment

All monitoring equipment used during this project will be inspected and calibrated at least daily to ensure that it is in proper working condition. If any piece of required monitoring equipment does not work properly, work in the monitored area will stop and will not continue until the monitoring equipment is repaired.

Because exposure to airborne contaminants is expected to be limited to VOCs associated with gasoline, air monitoring will be performed with a photoionization detector (PID). The range of contaminants expected to be present require that the PID be equipped with a *10.2 eV* detector lamp. The most significant (from a health standpoint) and likely airborne constituent is benzene. Because the site action level for VOCs is set at 5 ppm and the PEL for benzene is 1 ppm, it will be important to evaluate if the total VOC concentration detected in the indoor air is greater than 1 ppm benzene. If total VOC concentrations are greater than 1 ppm over background (sustained for >15 minutes), colorimetric tubes will be used to evaluate the benzene concentration. If benzene is detected at concentrations greater than 1 ppm in the breathing zone, engineering controls will be implemented.

The PID must be "zeroed" and calibrated according to manufacturer instructions at least daily. Initial monitoring will be performed every 15 minutes, unless odors, tastes, or a PID response indicate the presence of airborne contaminants above background levels. If airborne contaminants are detected, air monitoring will be performed continuously.

4.1.2 Action Levels

The action levels presented in Table 3 are based on the presence of benzene, which has the lowest PEL and REL of the compounds listed in Table 1.

Table 3. Air Monitoring Action Levels
Photoionization Detector (PID)

Reading	Length of Time	Protective Measure
< 5 ppm	15 minute average	Level D PPE.
>1 ppm over background	15 minute average	Evaluate benzene concentrations relative to total VOCs using colorimetric tubes.
5-25 ppm	15 minute average	Allow work area to vent. If persistent, upgrade to Level C PPE.
25-50 ppm	Sustained over 15 minutes	Level C PPE with high-efficiency organic vapor cartridges.
> 50 ppm	One (1) minute average	Vacate work area. Notify Site Health and Safety Officer immediately.

4.2 Site Monitoring

The Site Health and Safety Officer will visually inspect the work site at least daily to identify whether any new potential hazards have arisen. If and whenever possible, immediate measures will be taken to eliminate or reduce the risks associated with these hazards.

5.0 HAZARD ANALYSIS BY TASK

The following section identifies potential hazards associated with each task listed in Section 2.2 of this Health and Safety Plan. Unless otherwise noted, work will begin and proceed in Level D personal protective equipment (PPE). The level of protection will be upgraded accordingly by the Site Health and Safety Officer whenever warranted by conditions present in the work area.

Workers performing general site activities will wear level D protection including the following items:

- hard hat
- safety glasses
- steel-toed work shoes or boots
- work gloves (leather, canvas, or other appropriate material, when working with mechanical equipment)

Temperature-appropriate long pants are required. Hearing protection will be made available to all site workers. In addition, workers performing sampling activities will wear chemical-resistant gloves (nitrile or equivalent material) during sampling activities. Air monitoring will be conducted as a protective measure as indicated in Section 4. Should air monitoring indicate the need to upgrade to Level C, respiratory protection will be added to PPE requirements. Should conditions change beyond the scope of this plan, work will stop and this health and safety plan will be amended, as appropriate, before resuming work.

Tasks 1 and 2 – Installation of borings and wells and trenching: exposure to volatile organic compounds; working around drilling and heavy equipment; subsurface utilities; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards.

Task 3 – Improvement of the existing ground water treatment system: hazards associated with this task will be variable depending on the nature of the improvement. Minor improvements will be reviewed internally to identify potential hazards; major improvements will include a broader review possibly involving outside expertise. Potential hazards for this task include head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards related to major equipment changes.

Tasks 4, 5, and 6 – Soil, water, and air sampling: exposure to volatile organic compounds; electrical and mechanical hazards; noise, fall, and lifting hazards.

6.0 SITE CONTROL

The following section identifies several activity zones located on the work site. Access to these activity zones (e.g., the exclusion zone) will be restricted to designated personnel.

6.1 Exclusion Zone

When boring, using DP equipment, trenching or performing any other “invasive” operation the work site will be secured. Only site workers with appropriate training and wearing the appropriate PPE will be allowed into the exclusion zone work area. Unauthorized personnel will not be allowed within the exclusion zone. Depending on the work activity, air monitoring of personnel breathing zones may be performed to monitor possible exposure to site contaminants. Section 4.1.2 lists action levels for air monitoring.

To minimize the possible spread of contaminated materials, the amount of equipment and number of personnel allowed in the exclusion zone will be kept to a minimum. Personnel will not kneel or sit on the ground and activities that may scatter dust or splash fluids, or any practice that may increase the possibility of hand-to-mouth transfer of contaminated material will be prohibited. Eating, drinking, chewing gum, smoking, and use of smokeless tobacco are prohibited in the exclusion zone.

6.2 Contamination Reduction Zone

A specified area adjacent to the exclusion zone will be established for the decontamination of sampling equipment and personnel (as necessary).

6.2.1 Decontamination Procedures - Equipment

Auger flights, direct-push probes, and other down-hole equipment will be decontaminated with Alconox (or equivalent) soap and water and rinsed with distilled water prior to collecting soil samples for analysis. An alternative method of decontamination is to steam clean all down-hole sampling and drilling equipment. All decontamination wastes will be containerized and left in a designated on-site location, pending analytical results.

6.2.2 Decontamination Procedures - Personnel

All personal protective clothing (e.g., nitrile gloves, coveralls) and other miscellaneous waste will be bagged in opaque garbage bags and will be discarded in the trash. Personnel decontamination will consist of brushing dirt from clothing and shoes and disposing of chemical–resistant gloves between samples, before work breaks, and when quitting work for the day. It is recommended that personnel have a change of clothing available, if work clothing becomes grossly contaminated.

7.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

The purpose of this section is to define procedures and specific responsibilities that are to be followed in the event that a chemical spill or release, a fire or explosion, or an accident involving injuries occurs. The Site Health and Safety Officer, or a designated alternate, will determine when emergency and/or regulatory agencies should be contacted and which agencies are appropriate to contact. It should be noted that if injuries have occurred, all site workers have the responsibility to secure medical help for the affected worker(s). Medical emergency help can be contacted at the appropriate phone numbers listed on the first page of this Plan.

Site personnel should be continuously aware of site conditions and try to prevent potential emergency situations from occurring. Factors to be aware of are planned work activities, visible or odorous chemicals, vehicular traffic, nearby electrical lines, weather conditions, and physical hazards. Potential emergency situations should be anticipated and plans made to avoid problems before they occur. In case of emergency the Site Health and Safety Officer will alert all site personnel and evacuate, as necessary, to a safe assembly area. All site personnel will be accounted for and the necessary notifications will be made.

In all emergency situations, the rule is SAFETY FIRST! Do not, under any circumstances, endanger yourself or others to rescue a fallen co-worker. It is far better to rescue one person after proper safety measures for the rescue have been carefully considered, than to have to rescue additional people whose haste to help out got them in trouble.

In case of an emergency event or injury call 911.

8.0 ADMINISTRATIVE

8.1 Medical Surveillance

Personnel involved with field activities must be covered under their employer's medical surveillance program that includes annual physical examinations and certification to wear respiratory protective equipment. These medical monitoring programs must be in compliance with all applicable worker health and safety regulations.

8.2 Record Keeping

The Site Health and Safety Officer, or a designated alternate, will be responsible for keeping daily logs of workers and visitors present at the work site, attendance lists of personnel present at site health and safety meetings, accident reports, air monitoring results, and signatures of all personnel who have read this Health and Safety Plan.

SIGNATURE PAGE

I have read this Health and Safety Plan and understand its contents. I agree to abide by its provisions and will immediately notify the Site Health and Safety Officer if site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation